IN THE UNITED STATES DISTRICT COURT
FOR THE NORTHERN DISTRICT OF GEORGIA
ATLANTA DIVISION

EMMA KOE et al.,

Plaintiffs,

v.

CAYLEE NOGGLE et al.,

Defendants.

Civil Action No. 1:23-cv-02904-SEG

DEFENDANTS' DISCLOSURE OF EXPERT REPORT OF MICHAEL K. LAIDLAW, M.D.

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EXPERT REPORT OF MICHAEL K. LAIDLAW, M.D.

I, Michael K. Laidlaw, M.D., hereby declare as follows:

1. I am over the age of eighteen and submit this expert declaration based on my personal knowledge and experience.

2. I am a board-certified endocrinologist. I received my medical degree from the University of Southern California in 2001. I completed my residency in internal medicine at Los Angeles County/University of Southern California Medical Center in 2004. I also completed a fellowship in endocrinology, diabetes and metabolism at Los Angeles County/University of Southern California Medical Center in 2006.

3. The information provided regarding my professional background is detailed in my curriculum vitae. A true and correct copy of my curriculum vitae is attached as Exhibit A.

4. In my clinical practice as an endocrinologist, I evaluate and treat patients with hormonal and/or gland disorders. Hormone and gland disorders can cause or be associated with psychiatric symptoms, such as depression, anxiety, and other psychiatric symptoms. Therefore, I frequently assess and treat patients demonstrating psychiatric symptoms and determine whether their psychiatric symptoms are being caused by a hormonal issue, gland issue, or something else.

5. I have been retained by Defendants in the above-captioned lawsuit to provide an expert opinion on the efficacy and safety of sex reassignment treatment.

6. If called to testify in this matter, I would testify truthfully and based on my expert opinion. The opinions and conclusions I express herein are based on a reasonable degree of scientific certainty.

7. I am being compensated at an hourly rate of $500 per hour plus expenses for my time spent preparing this declaration, and to prepare for and provide testimony in this matter. I am being compensated at an hourly rate of $750 for testimony at depositions or trial. My compensation does not depend on the outcome of this litigation, the opinions I express, or the testimony I may provide.

8. My opinions contained in this report are based on: (1) my clinical experience as an endocrinologist, in particular dealing with hormone excess, hormone deficiency, and hormone balance; (2) my clinical experience evaluating individuals who have or have had gender incongruence, including a detransitioner; (3) my knowledge of research and studies regarding the treatment of gender dysphoria, including for minors and adults; and (4) my first-hand experience in human research as a physician, having been involved in two studies, one involving magnesium and bone density and the other involving ultrasound use for detecting

recurrent thyroid cancer.[1] I frequently review medical studies conducted by others and have experience assessing the strengths and weaknesses of such studies.

9. I was provided with and reviewed the following case-specific materials: The complaint of the plaintiffs; the various declarations submitted by the Plaintiffs, including the expert declarations submitted by Dr. Shumer. Dr. Massey and Dr. McNamara; and the law in question.

10. In the previous four years, I have provided expert testimony in the following cases: *Poe v. Drummond*, Case No. 23-cv-00177-JFH-SH (N.D. Okla.); *Doe 1 v. Thornbury*, Case no. 3:23-CV-00230-DJH (W.D. Ky.); *L.W. v. Skrmetti*, Case no. 3:23-cv-00376 (M.D. Tenn.); *Boe v. Marshall*, Case No. 2:22-cv-184-LCB (M.D. Ala.); *Dekker v. Marstiller*, Case No. 4:22-cv-00325-RHMAF (N.D. Fla.); *C.P. v. Blue Cross Blue Shield of Illinois,* Case No. 3:20-cv-06145-RJB (W.D. Wash.); *PFLAG, Inc. v. Abbott*, Case No. D-1-GN-22-002569 (Tex. 459th Judicial Dist.); *Paoli v. Hudson*, Case No. 279126 (Cal. Super. Ct.); *D.H. v. Snyder*, Case No. 4:20-cv-00335-SHR (D. Ariz.); *A.M. v. Dr. F and Daniel McKee*, File No. S2011599 (S. Ct. of British Columbia, Vancouver Registry, 11/23/20 & 11/25/20);

[1] For the latter study I helped to design an Institutional Review Board ("IRB") approved protocol. Furthermore, I received certification in the required course "Understanding the Fundamentals: Responsibilities and Requirements for the Protection of Human Subjects in Research" at the University of Southern California in 2003.

and *A.B. v. D.C. and E.F.*, File No. CA45940 (Court of Appeal, Vancouver Registry, B.C. Canada), File No. E190334 (S. Ct. of British Columbia 24 Jun 2019).

11. In my professional opinion, treatment interventions on behalf of children and adults diagnosed with gender dysphoria must be held to the same scientific standards as other medical treatments. These interventions must be optimal, efficacious, and safe. Any treatment which alters biological development in children should be used with extreme caution. Except in the case of a fatal injury or disease, the minor will become an adult and present to the adult physician. The adult physician must be able to have a thorough understanding of any condition which alters the biological development of children and, in the case of the endocrinologist, be knowledgeable about the long-term effects of hormones on the human body, particularly when the hormones are being used in ways that alter development.

12. The following expresses my expert opinion regarding minors who present with a disparity between their biological sex and internal feeling about their gender, specifically with regard to the use of social transition, medications which block normal pubertal development, the applications of hormones of the opposite sex, and surgical procedures that alter the genitalia and/or breasts for those individuals.

I. Background

A. Biological Sex in Contrast to Gender Identity

13. A recognition and understanding of biological sex is critical to the practice of endocrinology because the endocrine physiology of men and women, boys and girls, differ.

14. Biological sex is the objective physical condition of having organs and body parts which correspond to a binary sex. There are only two physical sexes, male and female. The male is identified as having organs and tissues such as the penis, testicles, and scrotum. The female sex is identified by having organs and tissues such as the labia, vagina, uterus, and ovaries. Biological sex is easily identified by physical observation such that adults and even young children can identify the biological sex of a newborn baby.

15. It is also noteworthy that the physical organs described above as representing biological sex have a physical genetic correlate. In other words, it is a well-established scientific fact that two X chromosomes identify the cells correlating to a female person, and an X and a Y chromosome correlate to a male person.

16. Dr. Shumer states, "Sex is comprised of several components, including, among others, internal reproductive organs, external genitalia, chromosomes, hormones, gender identity, and secondary sex characteristics (IOM, 2011)." (Shumer decl, par 24, emphasis added). Dr. Shumer is incorrect to include "gender identity" as a component of sex. What he states contradicts the Diagnostic and

Statistical Manual of Mental Disorders (DSM-5 TR), which states that "sex and sexual refer to the biological indicators of male and female (understood in the context of reproductive capacity), such as in sex chromosomes, gonads, sex hormones, and non-ambiguous internal and external genitalia." (DSM-5 TR, emphasis added). Note that gender identity is not a component of biological sex as defined by the DSM 5.

17. Gender identity in the DSM 5 is defined separately: "Gender identity is a category of social identity and refers to an individual's identification as male, female, or, occasionally, some category other than male or female." (DSM 5-TR). So we can see that gender identity is not a physical entity but is described as a social identity. It is a subjective identification known only once a patient makes it known. It cannot be identified by any physical means, cannot be confirmed by any outside observer, and can change over time.

18. Gender identity is a psychological concept. It has no correlate in the human body. As my colleagues and I have explained in a letter to the editor critiquing the Endocrine Society Guidelines, "[t]here are no laboratory, imaging, or other objective tests to diagnose a 'true transgender' child." (Laidlaw et al., 2019).

19. For example, one cannot image human brain to find a person's gender identity. Likewise, there is no other imaging, laboratory tests, biopsy of tissue, autopsy of the brain, genetic testing, or other biological markers that can identify

gender identity. There is no known gene that maps to gender identity or to gender dysphoria. In other words, there is no objective physical measure to identify either gender identity or gender dysphoria.

20. This is in contrast to endocrine disorders which have a measurable physical change in either hormone levels or gland structure that can be confirmed by physical testing. Therefore, gender dysphoria is a purely psychological phenomenon and not an endocrine disorder. But as my colleagues and I wrote in our letter to the editor, it becomes an endocrine condition through so-called gender affirmative therapy: "Childhood gender dysphoria (GD) is not an endocrine condition, but it becomes one through iatrogenic puberty blockade (PB) and high-dose cross-sex (HDCS) hormones. The consequences of this gender-affirmative therapy (GAT) are not trivial and include potential sterility, sexual dysfunction, thromboembolic and cardiovascular disease, and malignancy." (Laidlaw et al. 2019).

21. Dr. Massey states that "[g]ender identity has a significant biological basis and cannot be altered through medical or psychological interventions." (Massey decl, par 20). However, he neither presents evidence as to what that biological basis is nor what biological testing can be done to correctly identify the gender identity.

22. Dr. Massey goes on to state that "[t]he evidence demonstrating that gender identity cannot be altered, either for transgender or for non-transgender

individuals, underscores the innate nature of gender identity." (Massey decl, par 21). But he offers no explanation as to what sort of objective testing procedures are performed to confirm an immutable gender identity.

23. Dr. McNamara states that after an adolescent is given medication to block normal puberty as part of GAT, then "the adolescent and their family are given time to work with a mental health provider to confirm the young person's gender identity." (McNamara decl, p. 43). But she offers no explanation as to what sort of objective testing procedures are performed to make the confirmation of an immutable gender identity.

24. Dr. Shumer states in paragraph 28 of his declaration: "Scientific research and medical literature across disciplines demonstrates that gender identity, like other components of sex, has a strong biological foundation ... In one such study, the volume of the bed nucleus of the stria terminalis (a collection of cells in the central brain) in transgender women was equivalent to the volume found in cisgender women." The study that Dr. Shumer references, Chung et al., 2002, involved autopsies of 50 deceased person's brains to examine the tissue. This sort of examination obviously cannot be done on living persons and has not been validated in any way to confirm gender identity. Likewise, there has been no imaging (such as an MRI or CT scan of the brain) to examine the nucleus of the stria terminalis that has been validated to confirm the gender identity of a patient. In any event, the

plaintiffs' declarations here do not state that a brain scan, blood tests, biopsy or other biological tests or markers were performed to confirm their claimed gender identity.

25. Dr. Shumer states that "[t]win studies have shown that if an identical twin is transgender, the other twin is much more likely to be transgender compared to fraternal twins, a finding which points to genetic underpinnings to gender identity development." (Shumer decl, par 29). However, if gender identity is actually determined by genes, we would expect that identical twins would profess having the same gender identity nearly 100 percent of the time. This is not the case. In fact, the largest transexual twin study ever conducted included seventy-four pairs of identical twins. (Diamond, 2013). They were studied to determine in how many cases both twins would grow up to identify as transgender. In only twenty-one of the seventy-four pairs (28 percent) did both identical twins identify as transgender. This is consistent with the fact that multiple factors play a role in determining gender identity, including psychological and social factors. This study suggests that those factors are more important than any potential genetic contribution. Furthermore, no genetic studies have ever identified a transgender gene or genes. And again, none of plaintiffs here claim in their declarations to have used genetic testing to verify their gender identities.

26. Sex is clearly identified in 99.98% of cases by chromosomal analysis (Sax, 2002). Sex is also clearly recognized at birth in 99.98% of cases. (*Id.*).

Therefore, sex is a clear and provable objective reality that can be identified through advanced testing such as karyotyping, or simple genital identification at birth by any layperson. The other 0.02% of cases have some disorder of sexual development (DSD). DSDs do not represent an additional sex or sexes, but simply a disorder on the way to binary sex development (Chan et al., 2021). Importantly, none of the plaintiffs claim to have been diagnosed with a disorder of sexual development.

27. Dr. Shumer states: "There is also ongoing research on how differences in fetal exposures to hormones may influence gender identity. This influence can be examined by studying a medical condition called congenital adrenal hyperplasia." (Shumer decl, par 30). Congenital adrenal hyperplasia is a DSD. None of the plaintiffs have claimed to have a diagnosis of congenital adrenal hyperplasia or any other DSD. Nor do the plaintiffs claim to have suffered from fetal exposure to opposite-sex hormones.

B. Human Sexual Development

1. Embryologic Development

28. Another confirmation that there are only two biological sexes comes from what is known about embryologic development and fertilization. The biologic development of the human person begins with a gamete from a female, termed an ovum or egg, and a gamete from a biological male, which is termed sperm. The fertilization of the egg by the sperm begins the process of human biological

development. The cells of the fertilized ovum then multiply, and the person undergoes the incredible changes of embryologic development.

29. It is noteworthy that the male sperm comes from the biological male and the female egg comes from the biological female. There is no other third or fourth or fifth type of gamete that exists to begin the development of the human person. This is consistent with the binary nature of human sex (Alberts et al., 2002).

30. The sex binary of the human embryo is further developed between roughly weeks 8 to 12 of human development. There are two primitive structures present within the developing embryo called the Wolffian duct and Mullerian ducts (Larsen et al., 2003). The Wolffian ducts develop into substructures of the genitalia including the vas deferens and epididymis, which belong exclusively to the male sex. For the female, the Mullerian ducts go on to form the uterus, fallopian tubes, cervix and upper one third of the vagina, which belong exclusively to the female sex (*Id.*).

31. Significantly, once the male structures are developed from Wolffian ducts, the Mullerian ducts are obliterated. This means that throughout the rest of embryological development the Mullerian ducts will not form into biological female structures. Likewise, in the female, the Wolffian ducts are destroyed by week 12 and will not form male structures at any point in the future (*Id.*).

32. Thus, we can see in very early development that the sex binary is imprinted physically not only in the chromosomes, but also on the very organs that the body produces. Additionally, the potential to develop organs of the opposite sex is eliminated. Thus, in the human being there are only two physical tracts that one may progress along, the one being male and the other being female (Wilson and Bruno, 2022).

2. Pubertal Development

33. As mentioned previously, at the time of birth an infant's sex is easily identified through observation of the genitalia. Corresponding internal structures could also be confirmed through imaging if needed.

34. In early childhood, some low level of sex hormones is produced by the sex glands. The male testes produce testosterone. The female ovaries produce primarily the hormone estrogen. These sex glands remain quiescent for the most part, producing low levels of sex hormones until the time of pubertal development.

35. Dr. Shumer states that "[p]uberty is a process of maturation heralded by production of sex hormones—testosterone and estrogen—leading to the development of secondary sex characteristics." (Shumer, par 60). Dr. Shumer presents a very limited view of puberty. Puberty is an essential part of human development. Its purpose is to achieve full adult sexual function and reproductive capacity.

36. Puberty is a time of development of the sex organs, body, and brain. There are well known changes in physical characteristics of the male such as growth of facial hair, deepening of the voice, and increasing size of the testicles and penis. Importantly, the testicles will develop sperm under the influence of testosterone and become capable of ejaculation. Because of these changes, the male will become capable of fertilizing an egg. The inability to produce sperm sufficient to fertilize an egg is termed infertility.

37. For the female, pubertal development includes changes such as breast development, widening of the pelvis, and menstruation. The female will also begin the process of ovulation, which is a part of the menstrual cycle and involves the release of an egg or eggs from the ovary. Once the eggs are released in a manner in which they can become fertilized by human sperm, then the female is termed fertile. The inability to release ovum that can be fertilized is infertility (Kuohong and Hornstein, 2021).

3. Tanner Stages of Development

38. From a medical perspective it is important to know the stage of pubertal development of the developing adolescent. This can be determined through a physical examination of the body. The female will have changes in breast characteristics and pubic hair development.

39. Similarly, the male will have changes in testicular size and pubic hair development. These findings can be compared to the Tanner staging system, which will allow the stage of puberty to be known.

40. Tanner stages are divided into five. Stage 1 is the pre-pubertal state before pubertal development of the child begins. Stage 5 is full adult sexual maturity. Stages 2 through 4 are various phases of pubertal development (Greenspan and Gardner, 2004).

41. Awareness of the Tanner stage of the developing adolescent is also useful to assess for maturation of sex organ development leading to fertility. For girls, the first menstruation (menarche) occurs about two years after Tanner stage 2 and will typically be at Tanner stage 4 or possibly 3 (Emmanuel and Boker, 2022). The first appearance of sperm (spermarche) will typically be at Tanner stage 4 (*Id.*). If puberty is blocked or disrupted before reaching these critical stages, the sex glands will be locked in a premature state and incapable of fertility.

4. Biological Sex Cannot Be Changed

42. It is not possible for a person to change from one biological sex to the other, and there is no technology that allows a biological male to become a biological female or vice-versa. It is not technologically possible to change sex chromosomes; these will remain in every cell throughout life. It is not technologically possible to transform sex glands from one to the other. In other words, there are no hormones

or other means currently known to change an ovary into a testicle or a testicle into an ovary.

43. Furthermore, as noted earlier, several of the sex specific structures (such as the epididymis of the male or uterus of the female) are produced early in embryological development from around weeks 8 to 12. The primitive ducts which lead to these organs of the opposite sex are obliterated. There is no known way to resuscitate these ducts and continue development of opposite-sex structures.

44. It is also not possible to produce gametes of the opposite sex. In other words, there is not any known way to induce the testicles to produce eggs. Nor is there any known way to induce the ovaries to produce sperm. Therefore, creating conditions for a biological female to create sperm capable of fertilizing another ovum is impossible. The induction of opposite-sex fertility is impossible.

45. In fact, as I will discuss, so-called gender affirmative therapy actually leads to infertility and potential sterilization.

C. Endocrine Disorders

46. Before discussing gender dysphoria and gender affirmative therapy from the perspective of an endocrinologist, it is helpful to discuss the background of endocrine diseases. This background demonstrates the difference in gender dysphoria, which is a psychological diagnosis, and other conditions treated by endocrinologists, which are physical diagnoses.

47. Endocrinology is the study of glands and hormones. Endocrine disorders can be divided into three main types: those that involve hormone excess, those that involve hormone deficiency, and those that involve structural abnormalities of the glands such as cancers.

48. It is important for the endocrinologist to determine the cause of hormone gland excess or deficiency in order to devise an appropriate treatment plan. The plan will generally be to help bring the hormones back into balance and thus bring the patient back to health.

49. To give an example of hormone excess, hyperthyroidism is a term which means overactivity of the thyroid gland. In this condition, excess thyroid hormone is produced by the thyroid gland. This results in various physical and psychological changes for the afflicted patient. Examples of physical changes can include tachycardia or fast heart rate, hand tremors, and weight loss. Examples of psychological symptoms include anxiety, panic attacks, and sometimes even psychosis.

50. An endocrinologist can recognize thyroid hormone excess in part by signs and symptoms, but can also confirm the diagnosis with laboratory testing that shows the thyroid hormones to be out of balance. Once this is determined and the degree of excess is known, then treatments can be given to bring these levels back

into balance to benefit the patient's health and to prevent other disease effects caused by excess hormone.

51. To give another example, consider a deficiency of insulin. Insulin is a hormone which regulates blood glucose levels. If there is damage to the pancreas such that insulin levels are very low, then blood glucose levels will rise. If the glucose levels rise to a certain abnormally high level, then this is considered diabetes. In the case of type 1 diabetes, insulin levels are abnormally low and therefore blood glucose levels are abnormally high, leading to a variety of signs and symptoms. For example, the patient may have extreme thirst, frequent urination, muscle wasting, and weight loss. They may often experience lethargy and weakness.

52. In this case, laboratory tests of glucose and insulin levels can confirm the diagnosis. Once diabetes is confirmed, the patient is then treated with insulin to help restore glucose balance in the body and prevent long-term complications of diabetes.

53. To give an example of a structural abnormality, a patient may have a lump on the thyroid gland in the neck. This may be further examined by an imaging test such as an ultrasound. A needle biopsy can be performed so that the cells can be examined under a microscope. A trained medical professional such as a pathologist can then examine the cells to determine if they are benign or cancerous. In the case

of a thyroid cancer, a surgical procedure known as a thyroidectomy may be performed to remove the diseased thyroid gland in order to treat the cancer.

54. Noteworthy in the preceding three examples is that all three disease conditions are diagnosed by physical observations. In other words, a laboratory test of a hormone, an imaging test of an organ, an examination of cells under a microscope, or all three may be employed in the diagnosis of endocrine disease.

D. Gender Dysphoria is a Psychological Diagnosis

55. Gender dysphoria, on the other hand, is not an endocrine diagnosis. It is in fact a psychological diagnosis. It is recognized as a persistent state of distress that stems from the feeling that one's gender identity does not align with one's physical sex (DSM-5 TR). It is diagnosed purely by psychological methods of behavioral observation and questioning. The criterion for diagnosis is found in the Diagnostic and Statistical Manual of Mental Disorders (DSM-5 TR).

56. What is unique about gender affirmative therapy is that hormones are being administered to alter the human body based on a psychological condition and not a physical condition. Even more than that, hormones are being administered in high doses to produce the endocrine conditions of hyperandrogenism and hyperestrogenemia—abnormal conditions that endocrinologists normally would treat or resolve. Also, GnRHa (puberty blocking medications) are given to cause the

endocrine condition hypogonadotropic hypogonadism which results in deficiencies of sex hormones and stops normal adolescent pubertal development.

57. As a practicing endocrinologist and scientist, I have studied GD and its treatment for two reasons: 1) I want to ensure that my colleagues and I understand the science before we treat any patients with GD; and 2) I am concerned that the medical society that claims to speak for me and other endocrinologists has abandoned scientific principles in endorsing treatments for GD that have questionable scientific support. The opinions expressed in this report are the result of my own experience, studies, education, and review of the scientific literature related to GD.

II. Gender Affirmative Therapy

58. In the section that follows, I discuss four interventions (social transition, blocking normal puberty, opposite-sex hormones, and surgery) that some clinicians are using to treat gender dysphoria. Each intervention can lead to iatrogenic harms to the patient. The term "iatrogenic" is used in medicine to describe harms or newly created medical conditions that are the result of a treatment. These harms will be described in detail below. I speak of these harms because it is important to understand that once a patient begins gender-affirmative therapy (GAT) it is more likely the patient will continue on to surgery (de Vries et al., 2014). Thus, GAT interrupts the natural desistance process and instead places the patient on a

lifetime regimen of hormonal and surgical care. Understanding these harms is critical to my practice as an endocrinologist, because if I did not understand these harms, I could not advise patients of the risks associated with GAT.

59. There are three general approaches to treating gender dysphoria in minors (Zucker, 2020). One is psychosocial treatment that helps the young person align their internal sense of gender with their physical sex. Another is to "watch and wait" and allow time and maturity to help the young person align sex and gender through natural desistance, while providing psychological support and therapy as needed and addressing comorbidities. The third option is referred to as gender affirmative therapy.

60. Gender affirmative therapy of adults and minors consists of psychosocial, medical, and surgical interventions that attempt to psychologically and medically alter the patient so that they come to believe they may become similar to the physical sex which aligns with their gender identity (but not their biological sex) and thereby reduce gender dysphoria. GAT consists of four main parts: 1) social transition, 2) blocking normal puberty or menstruation, 3) high-dose opposite-sex hormones, and 4) surgery of the genitalia and breasts.

61. The application of this medical therapy to minors[2] is a fairly new intervention and is associated with a number of harms both known and unknown. GAT suffers from a lack of a quality evidence-base, poorly performed studies, and ongoing unethical human experimentation. As discussed below, in my professional opinion as an endocrinologist, no child should be given these treatments.

A. Social Transition

62. The first stage of gender affirmative therapy is termed social transition. Social transition is a psychological intervention. The child may be encouraged to adopt the type of clothing and mannerisms or behaviors which are stereotypical of the opposite sex within a culture. For example, in the United States, a boy might wear his hair long and wear dresses in order to socially transition. A girl may cut her hair short and wear clothes from the boys' section of a department store.

[2] "[T]he US Department of Health and the Food and Drug Administration reference approximate age ranges for these phases of life, which consist of the following: (1) infancy, between birth and 2 years of age; (2) childhood, from 2 to 12 years of age; and (3) adolescence, from 12 to 21 years of age. Additionally, *Bright Futures* guidelines from the American Academy of Pediatrics identify adolescence as 11 to 21 years of age, dividing the group into early (ages 11–14 years), middle (ages 15–17 years), and late (ages 18–21 years) adolescence. The American Academy of Pediatrics has previously published a statement on the age limit of pediatrics in 1988, which was reaffirmed in 2012 and identified the upper age limit as 21 years with a note that exceptions could be made when the pediatrician and family agree to an older age, particularly in the case of a child with special health care needs. Recent research has begun to shed more light on the progression of mental and emotional development as children progress through the adolescent years into young adulthood. It is increasingly clear that the age of 21 years is an arbitrary demarcation line for adolescence because there is increasing evidence that brain development has not reliably reached adult levels of functioning until well into the third decade of life." (Hardin, 2017) (footnotes omitted).

63. Social transition of the child has been noted by expert researcher in the field of child gender dysphoria, Ken Zucker, to itself be a form of iatrogenic harm (Zucker, 2020). This is because the social transition process may solidify the young person's belief that they are in fact the sex opposite of their biological sex. The 2017 Endocrine Society Guidelines state that "[s]ocial transition is associated with the persistence of GD/gender incongruence as a child progresses into adolescence." (Hembree et al., 2017). A recent study also supports the contention that children who undergo social transition are more likely to have their gender dysphoria persist into adolescence. In the 2022 article "Gender Identity 5 Years After Social Transition," which studied 317 socially transitioned youths, the authors found that "most participants were living as binary transgender youth (94.0%)." (Olson et al., 2022).

64. From an endocrine point of view, it is understandable that a child having the outward appearance of the opposite sex, would believe that he or she is destined to go through puberty of the opposite sex, since children have only a poor understanding of the internal structures of the body, the function of the sex glands, the role of the sex glands in fertility, and so forth.

65. Therefore, it would be quite frightening for a boy who believes he is a girl to be turning into a man with all of the adult features that accompany manhood. Vice versa, the girl who has become convinced that she is a boy will be frightened by the physical changes brought on by womanhood.

66. In fact, it would appear that children and adolescents who have gone through a social transition may be anticipating a sort of disease state in the future by the hormone changes that will occur as a normal and natural part of human development. Until relatively recently in human history, it has not been possible to interfere with puberty through pharmaceutical means.

B. Medications Which Block Pubertal Development

1. Background

67. A second stage of gender affirmative therapy may involve blocking normal pubertal development. This is done with puberty blocking medications (PB) that act directly on the pituitary gland to cause the endocrine condition known as hypogonadotropic hypogonadism (HH).

68. Although the Georgia law at issue does not bar the use of puberty blockers, I describe the significant medical concerns regarding their use in GAT because of its relevance to the scientific debate and uncertainty over GAT generally and because Plaintiffs' proffered experts make unsubstantiated claims about the safety of such medication as part of GAT.

69. To understand what is occurring in this process, it is helpful to understand normal hormone function during pubertal development. There is a small pea-sized gland in the brain called the pituitary. It is sometimes referred to as the "master gland," as it controls the function of several other glands. One key function, for our purposes, is the control of the sex glands. There are two specific hormones

produced by the pituitary referred to as luteinizing hormone (LH) and follicle stimulating hormone (FSH). These are responsible for sex hormone production and fertility. The LH and FSH act as signals to tell the sex glands to begin or to continue their function.

70. In the adult male, the production of LH will cause adult levels of testosterone to be produced by the testicles. In the adult female, the production of LH will cause adult levels of estrogen to be produced by the ovaries.

71. In early childhood, prior to the beginning of puberty, the pituitary function with respect to the sex glands is quiescent. However, during pubertal development LH will signal the testicle to increase testosterone production, and this carries the boy through the stages of pubertal development into manhood. Likewise for the female, the interaction of LH with the ovaries increases estrogen production and carries the girl through the stages of development into womanhood.

72. Hypogonadotropic hypogonadism is a medical condition in which the pituitary does not send the hormonal signals (LH and FSH) to the sex glands. Therefore, the sex glands are unable to make their sex specific hormones of testosterone or estrogen.

73. If this condition occurs during puberty, the effect will be to stop pubertal development. This is a disease state which is diagnosed and treated by the endocrinologist.

74. Medications such as GnRH analogues (sometimes called puberty blockers) act on the pituitary gland to lower the pituitary release of LH and FSH levels dramatically. The result is a blockage of the signaling of the pituitary to the testicles or ovaries and therefore underproduction of the sex hormones. This will stop normal menstrual function for the female and halt further pubertal development. For the male this will halt further pubertal development. If the male had already reached spermarche, then production of new sperm will stop.

2. GnRH Agonist Medication Effects Vary by Use Case

75. There are a variety of uses for GnRH agonists. The use and outcome can be very different for different applications.

76. For example, the medication called Lupron, a GnRH agonist, was developed to treat prostate cancer. The idea being that blocking pituitary hormones will block the adult male's release of testosterone from the testicles. Since testosterone will promote the growth of prostate cancer, the idea is to lower testosterone levels to a very low amount and therefore prevent the growth and spread of prostate cancer. This is a labeled use of the medication. In other words, there is FDA approval for this use.

77. Another labeled use of GnRH agonist medication is for the treatment of central precocious puberty. In the disease state of central precocious puberty, pituitary signaling is activated at an abnormally young age, say age four, to begin

pubertal development. A GnRH agonist may be used to halt puberty which has begun at an abnormally early time. Here, the action of the medication on the pituitary will disrupt the signaling to the sex glands, stop early sex hormone production, and, therefore, stop abnormal pubertal development.

78. Then, at a more normal time of pubertal development, say age 11, the medication is stopped, and puberty is allowed to proceed. The end result is to restore normal sex gland function and timing of puberty. This is a labeled use for a GnRH agonist medication.

79. What about the use of GnRH analogue medications such as Lupron in gender affirmative therapy? In these cases, we have physiologically normal children who are just beginning puberty or are somewhere in the process of pubertal development. They have healthy pituitary glands and sex organs. However, a puberty blocking medication is administered to stop normal pubertal development.

80. In this case, the condition of hypogonadotropic hypogonadism described above (a medical disease) is induced by medication and is an iatrogenic effect of treating the psychological condition of gender dysphoria. GnRH analogue medications have not been FDA approved for this use. The use of GnRH analogue medication for this purpose in adolescents is experimental as there have been no randomized controlled trials for this specific use case.

81. Dr. Shumer states that "[o]ptions for treatment after the onset of puberty include the use of gonadotropin-releasing hormone agonists ('GnRHa') for purposes of preventing progression of pubertal development, and hormonal interventions such as testosterone and estrogen administration. These treatment options are based on robust research and clinical experience, which consistently demonstrate safety and efficacy." (Shumer decl, par 47). However, he fails to provide any evidence of studies that have short-term or longitudinal data on safety and efficacy for the treatment of adolescents with gender dysphoria.

82. In my opinion, there is not sufficient evidence to conclude that the use of puberty blockers to block natural puberty is safe when administered as part of gender affirmative therapy, or that its effects are reversible.

3. Hypogonadotropic Hypogonadism

83. As described above, hypogonadotropic hypogonadism is a condition in which the pituitary fails to send signals to the gonads, thereby preventing the testicle of the male from making testosterone or the ovary of the female from making estrogen.

84. As an endocrinologist, I frequently evaluate patients to ascertain if they have the condition of hypogonadotropic hypogonadism. This is done by a laboratory evaluation. If the patient has this condition, I then determine the cause and the proper treatment.

85. The primary hormone of the pituitary, which is abnormal in this condition, is called luteinizing hormone or LH. To diagnose the condition, a laboratory test with reference ranges based on the person's sex and age is used to evaluate the blood sample.

86. For example, figure 1 shows the normal laboratory reference range for LH over the course of a month in an adult pre-menopausal female (0.5-76.3 mIU/mL) (Quest LH, 2023). A very low level of LH (red) with low estrogen levels indicates hypogonadotropic hypogonadism.[3]

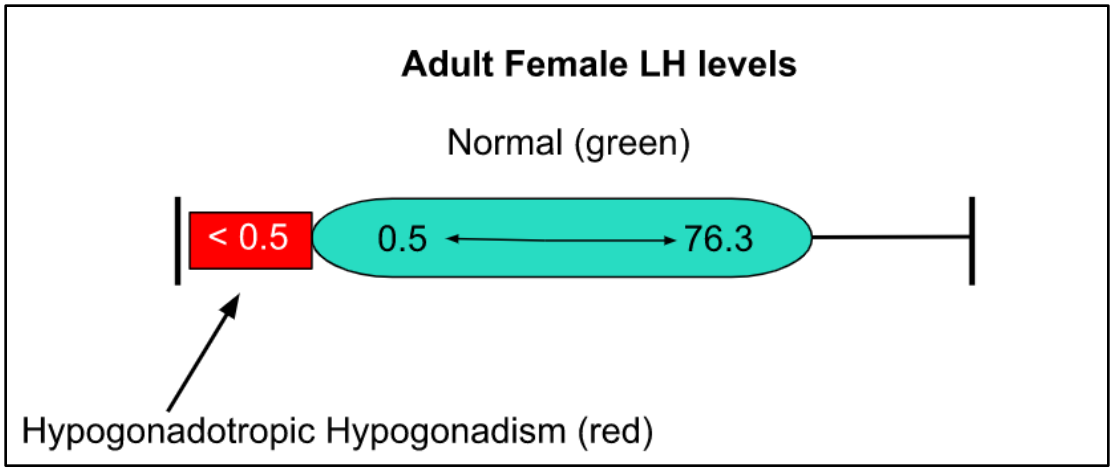

Figure 1.

87. As one can see, in hypogonadotropic hypogonadism the level of LH is below the reference range. In the female, this causes the cessation of estrogen production, and in the male it causes cessation of testosterone production. In adolescents of either sex, this will stop further pubertal development. For females in

[3] Levels will be similarly low for adolescents, though the normal reference range is different.

mid-puberty or beyond, this condition will also stop normal menstrual cycles and ovulation. For the male in mid-puberty or beyond, it will cause the cessation of normal sperm production.

88. As an endocrinologist, I would confirm the condition of hypogonadotropic hypogonadism based on laboratory results and then treat this medical condition.

89. What occurs to pituitary hormones and the sex hormones[4] when administering a GnRH analogue medication such as Lupron? The effect is identical to figure 1. Over time, the result of the medication is to cause very low LH levels (red) leading to low sex hormone levels, thereby medically inducing the condition of hypogonadotropic hypogonadism.

90. In GAT, the medical condition of hypogonadotropic hypogonadism is being deliberately created by the use of medications called GnRH analogues, one of which is Lupron.

4. Adverse Health Consequences of Blocking Normal Puberty

a. Infertility

91. There are a number of serious health consequences that occur as the result of blocking normal puberty. The first problem is infertility.

[4] The primary sex hormones being estrogen for females and testosterone for males.

92. Dr. Shumer states that "[i]n transgender youth, it is most typical to use GnRHa [puberty blockers] from the onset of puberty (Tanner Stage 2) until mid-adolescence." (Shumer decl, par 68). This is correct. However, he also states "GnRHa have no long-term implications on fertility." (*Id.*). That statement is misleading. GnRHa freeze the maturation and release of mature eggs in the female and stop testicular development and the production of mature sperm in the male. Therefore they immediately cause infertility, but albeit potentially transiently if the person discontinues the medication.[5] The issue of greater concern is what happens when the adolescent's puberty is stopped at an early stage and then opposite-sex hormones are administered in GAT. This combination of treatments has profoundly negative effects on fertility as I will explain.

93. The Endocrine Society Guidelines recommend beginning puberty blockers as early as Tanner stage 2. As discussed earlier, this is the very beginning of puberty. Fertility development happens later generally in Tanner stage 4. One can see that if the developing person is blocked at Tanner stage 2 or 3 as advocated by the guidelines, this is prior to becoming fertile. The gonads will remain in an immature, undeveloped state.

[5] However, there are no studies that I am aware of containing adolescents who had puberty stopped at Tanner Stage II (say at age 11) by GnRHa and then remained on this medication for an extended period of time (say age 18) to see if puberty would progress normally.

94. If they remain blocked in an early pubertal stage, then even the addition of opposite-sex hormones will not allow for the development of fertility. In fact, high-dose opposite-sex hormones may permanently damage the immature sex organs leading to sterilization. Certainly, the removal of the gonads by surgery will ensure sterilization.

95. In a Dutch study by de Vries et al. that included seventy adolescents who took puberty blockers, all seventy decided to go on to hormones of the opposite sex. (de Vries, et al. 2011). In a follow-up study by de Vries et al., the overwhelming majority went on to have sex reassignment surgery by either vaginoplasty for males or hysterectomy with ovariectomy for females. (de Vries, et al. 2014). These surgeries resulted in sterilization. This is why puberty blockers, rather than being a "pause" to consider aspects of mental health, are instead a pathway towards future sterilizing surgeries and potentially sterilizing hormonal treatments.

96. Although procedures to preserve fertility are available for patients in late pubertal stages (Tanner 4 and 5), studies show that less than 5% of adolescents in North America receiving GAT even attempt fertility preservation (FP). (Nahata, 2017). Moreover, for those in early pubertal stages (Tanner 2 and 3), "ovarian tissue cryopreservation is still considered experimental in most centers and testicular tissue cryopreservation remains entirely experimental. These experimental forms of FP would be the only options in children [with puberty] blocked prior to spermarche

and menarche and are high in cost and limited to specialized centers. Even with FP there is no guarantee of having a child." (Laidlaw, Cretella, et al., 2019).

97. Some clinicians suggest that the risks associated with puberty blockers for treatment of gender dysphoria are comparable to the risks associated with using puberty blockers to treat precocious puberty. But this assertion fails to recognize the very different effects of puberty blocker medications in early childhood versus during adolescence.

98. As an example, if a four-year-old child is diagnosed with precocious puberty, the abnormally early puberty may be halted by GnRH analogues. The child will at a later time have the puberty blocker discontinued and at that point normal pubertal development will be allowed to proceed. Therefore, when they are no longer taking the medication, they will gain natural fertility.

99. In contrast, puberty blocking medication given to minors as a part of GAT occurs during natural puberty, which is precisely the time that the adolescent person will gain reproductive function. The effects of puberty blockers (PB) on the adolescent are to prevent sperm production in the male and ovulation in the female, which produces the infertile condition. Importantly, so long as the minor continues PB they will remain infertile. Should they continue on to opposite-sex hormones as part of GAT, then they will remain infertile. There is the additional possibility that

cytotoxic effects of high dose opposite-sex hormones will damage the immature gonads leading to permanent sterility.

b. Sexual Dysfunction

100. Another problem youths who have HH and puberty stopped at an early stage can experience is sexual dysfunction. The child will continue their chronological age progression toward adulthood and yet remain with undeveloped genitalia. This will lead to sexual dysfunction, including potential erectile dysfunction and inability to ejaculate and orgasm for the male. For the female with undeveloped genitalia potential, sexual dysfunction may include painful intercourse and impairment of orgasm.

c. Negative Effects of Hypogonadotropic Hypogonadism on Bone Density

101. Puberty is a time of rapid bone development. This time period is critical in attaining what we call peak bone mass or the maximum bone density that one will acquire in their lifetime. (Elhakeem, 2019). The age at which peak bone mass is achieved has been shown to be in the early to late 20s in males and females, with females achieving peak bone mass earlier compared to males. (Lu et al., 2016). It is well established that "[p]eak bone mass is a strong predictor of osteoporosis in later life." (Kralick et al., 2020). Therefore, factors which lead to a lowering of peak bone mass will predispose a person to future osteoporosis. Adolescence is the critical time period when large amounts of bone accumulate rapidly. This rapid accumulation is referred to as peak bone velocity. In fact, "about 26% of final adult bone is

accumulated during the two years surrounding peak bone velocity ... These two critical years correspond to ages 11.5–13.5 for girls (Tanner stages 2–4) and 13.05–15.05 in boys (Tanner stages 3–5).” (MacKelivie et al., 2002) (citations omitted). This is precisely the time when puberty blocking hormones are being recommended as part of GAT which leads to low levels of sex hormones.

102. Any abnormal lowering of sex hormones occurring during this critical time will stop the rapid accumulation of bone and therefore lower ultimate adult bone density. If a person does not achieve peak bone density, they would be expected to be at future risk for osteoporosis and the potential for debilitating spine and hip fractures as adults. Hip fractures for the older patient very significantly increase the risk of major morbidity and death. (Bentler, 2009). Allowing a “pause” in puberty for any period of time leads to an inability to attain peak bone density.

103. DEXA scans are used to evaluate changes in bone density and to help evaluate risk for future fractures. In my practice, I order and interpret DEXA scans for this purpose.

104. The Z-score of a DEXA scan is used to compare a patient’s bone density to the same population based on age and sex. For example, a person who has a bone density similar to the average of the population would be at the 50th percentile. Those who have greater relative bone density would be above the 50th

percentile. Those who have lower bone density would have a Z-score below the 50th percentile.

105. Puberty blockers used in adolescence to cause HH will inhibit the normal accrual of bone density. This can be evaluated by DEXA scan. In a study in the UK, 44 patients aged 12-15 with gender dysphoria were given puberty blockers and tests of bone density were done at baseline, 12 months, 24 months, and 36 months (Carmichael, 2021).

106. Figure 2 shows the Z-scores of the average age-matched population percentile, which is 50%. It shows the average baseline (before puberty blockers) Z-score percentile for the study participants. It also shows the bone density percentile at 12, 24, and 36 months. One can see that the average baseline Z-score was about 32% compared to peers of similar age and sex. At 12 months this had decreased to about 15%, and by 24 months it had declined further to about 5% compared to their peers and remained at this low level.

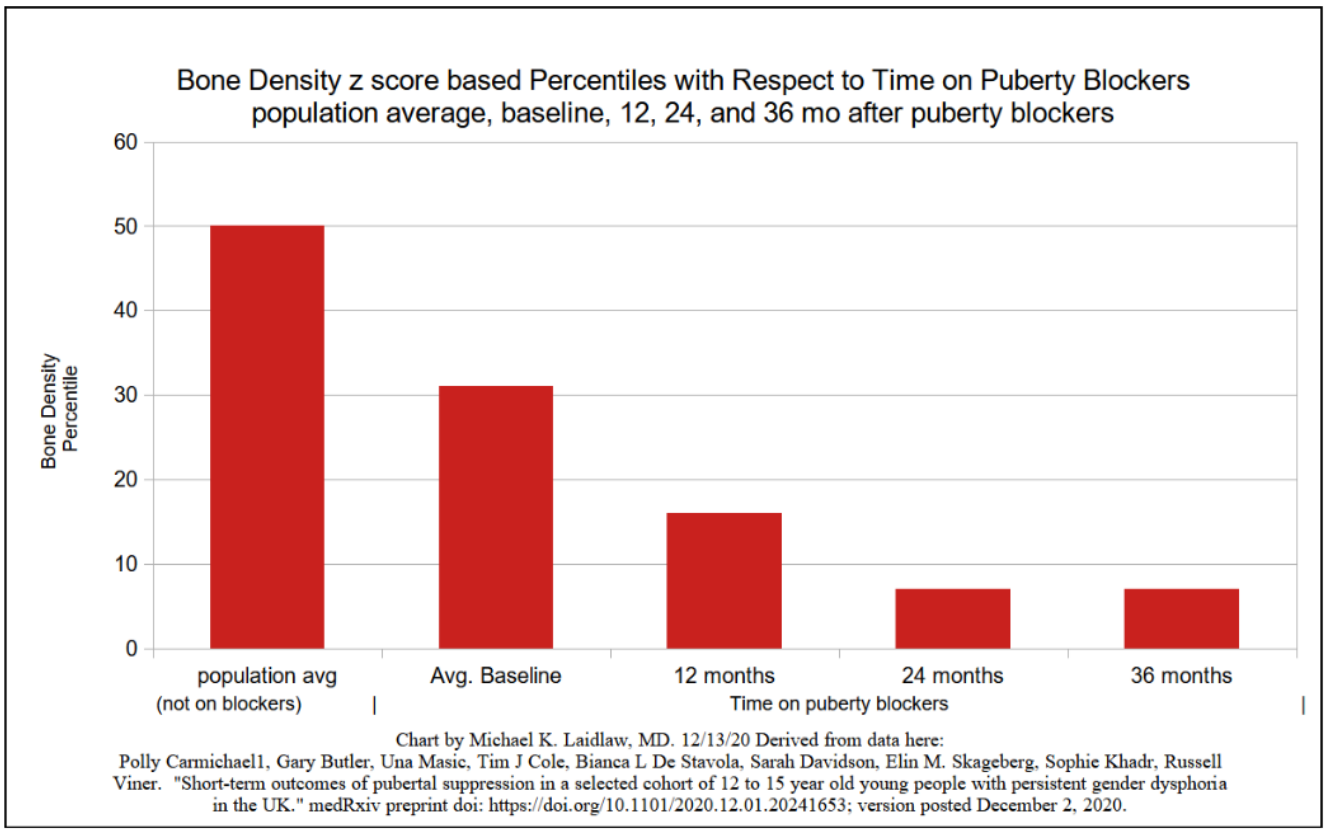

Figure 2

107. This is the same pattern of diminishing bone density compared to their peers that one would see in hypogonadotropic hypogonadism due to a pituitary injury. However, in these cases hypogonadotropic hypogonadism was caused by GnRH analogues (puberty blocking medication) that lead to greatly diminished bone density compared to their peers of the same age.

108. In natal females, hypogonadotropic hypogonadism (HH) leads to amenorrhea, meaning the absence of menstrual periods. Amenorrhea is detrimental

to bone health: "In addition to this[6] important long-term consequence of amenorrhea, other problems, such as premature bone demineralization or inadequate bone formation, are likely to put amenorrheic women at high risk for osteoporosis and fracture." (Santoro, 2011).

109. Dr. Shumer states "The treatment [puberty blockade] works by pausing endogenous puberty at whatever stage it is at when the treatment begins, limiting the influence of a person's endogenous hormones on their body." (Shumer decl, par 66). In actuality, allowing a "pause" or a "halt" in puberty for any period of time leads to an inability to attain peak bone density and puts the patient at future risk for osteoporosis and serious fractures as I have described.

110. Another consideration is the effects of HH in adolescents and late teens on the maturation of the human brain. Much of what happens in this area is unknown. However, "sex hormones including estrogen, progesterone, and testosterone can influence the development and maturation of the adolescent brain.." (Arain, 2013). Therefore, there are unknown, but likely negative, consequences to blocking normal puberty with respect to brain development.

[6] "This" refers to cardiovascular disease: "Diagnosis and treatment of amenorrheic states is of increasing clinical importance because lifetime menstrual irregularities are known to be predictive of subsequent CVD in women."

d. Psychosocial Development

111. A third major problem with blocking normal puberty involves psychosocial development. Adolescence is a critical time of physical, mental, and emotional changes for the adolescent. It is important that they develop socially in conjunction with their peers.

112. I am familiar with and rely upon the literature in this area involving the treatment of precocious puberty[7]. It is generally accepted in endocrinology that there are psychological benefits to adolescents who go through puberty around the same time as their peers. This is one reason why puberty blockers (GnRH analogues) in central precocious puberty are sometimes used to delay a child's abnormally early pubertal development to a more age-appropriate time.

113. The development of the adolescent along with their peers is also well recognized in the psychological literature: "For decades, scholars have pointed to peer relationships as one of the most important features of adolescence." (Brown, 2009). If one is left behind for several years under the impression that they are awaiting opposite-sex puberty, they will miss important opportunities for socialization and psychological development. Psychosocial development will be necessarily stunted as they are not developing with their peers. This is a permanent harm as the time cannot be regained.

[7] "The other concern often used as a rationale for treatment is negative psychosocial consequences of precocious puberty, particularly in girls" [emphasis added] (Eugster, 2019).

114. Aside from the multiple serious problems that are iatrogenically acquired by blocking normal puberty, there appear to be independent risks of the puberty blocking medication themselves. For example, one can read the "Adverse Reactions" section of the labeling of a common puberty blocking medication called Lupron Depot-Ped and find reactions identified after approval of the medication. Under psychiatric disorders reactions included: "emotional lability, such as crying, irritability, impatience, anger, and aggression. Depression, including rare reports of suicidal ideation and attempt. Many, but not all, of these patients had a history of psychiatric illness or other comorbidities with an increased risk of depression." (Lupron, 2022). This is particularly concerning given the high rate of psychiatric comorbidity with gender dysphoria (Kaltiala-Heino, 2015).

5. The Effect of Puberty Blockers on Desistance

115. As I explain later, a very high proportion of minors diagnosed with gender dysphoria will eventually desist or come to accept their physical sex. But puberty blockers have been shown to dramatically alter natural desistance.

116. As mentioned above, in a Dutch study that included seventy adolescents who took puberty blockers, all seventy decided to go on to hormones of the opposite sex. (de Vries, et al. 2011). In a follow-up study, the overwhelming majority went on to have sex reassignment surgery by either vaginoplasty for males or hysterectomy with ovariectomy for females. (de Vries, et al. 2014). These surgeries

resulted in sterilization. This is why puberty blockers, rather than being a "pause" to consider aspects of mental health, are instead a pathway towards future sterilizing surgeries.[8]

C. Opposite-Sex Hormones

117. The third stage of gender affirmative therapy involves using hormones of the opposite sex (also called cross-sex hormones) at high doses to attempt to create secondary sex characteristics in the person's body.

118. In GAT, what is termed "cross-sex hormones" is the use of hormones of the opposite sex to attempt to create secondary sex characteristics. To do so, very high doses of these hormones are administered. When hormone levels climb above normal levels they are termed supraphysiologic.

1. Testosterone

119. Testosterone is an anabolic steroid of high potency. It is classified as a Schedule 3 controlled substance by the DEA: "Substances in this schedule have a potential for abuse less than substances in Schedules I or II and abuse may lead to moderate or low physical dependence or high psychological dependence." (DEA, 2022). A licensed physician with a valid DEA registration is required to prescribe testosterone.

[8] The surgeries were consequential in another important way. One person who had a vaginoplasty died of post-surgical complications of necrotizing fasciitis, which is a rapidly progressive and very severe infection of the soft tissues beneath the skin and which has a high mortality. (*Id.*).

120. I prescribe testosterone to men for testosterone deficiency. The state of testosterone deficiency can cause various problems for men including problems of mood, sexual function, libido, and bone density. Prescription testosterone is given to correct the abnormally low levels and bring them back into balance. The dose of testosterone must be carefully considered and monitored to avoid excess levels in the male, as there are a number of serious concerns when prescribing testosterone. The use of high dose testosterone in females is experimental.

121. Contrast the FDA approved use of testosterone in males versus its experimental use in females. Testosterone is FDA approved for use in adult men as well as the pediatric male population aged 12 and older. (Actavis, 2018). There is no FDA-approved usage of testosterone for women or pediatric-aged females.[9] The prescribing indications for adult males and pediatric males are identical and are to treat the conditions of low testosterone caused by either primary hypogonadism or secondary hypogonadism (*Id.*). The intent of testosterone for women and pediatric aged females in GAT is to cause severe hyperandrogenism. In this case the purpose, effects, and ultimate outcome of the FDA-approved usage of testosterone for males versus the experimental use for females in GAT are very different. Therefore, the low-quality evidence guidelines of the Endocrine Society/WPATH are not an

[9] "Testosterone Cypionate Injection, USP is indicated for replacement therapy in the male in conditions associated with symptoms of deficiency or absence of endogenous testosterone." (Actavis, 2018).

acceptable substitute for proper scientific studies including randomized controlled trials. (Malone et al., 2021; Hembree et al., 2017).

122. Regarding the potential for abuse, the labeling reads: "Testosterone has been subject to abuse, typically at doses higher than recommended for the approved indication ... Anabolic androgenic steroid abuse can lead to serious cardiovascular and psychiatric adverse reactions ... Abuse and misuse of testosterone are seen in male and female adults and adolescents ... There have been reports of misuse by men taking higher doses of legally obtained testosterone than prescribed and continuing testosterone despite adverse events or against medical advice." (Actavis Pharma, 2018).

123. Adverse events with respect to the nervous system include: "Increased or decreased libido, headache, anxiety, depression, and generalized paresthesia." (Actavis Pharm, 2018).

124. With regard to ultimate height, "[t]he following adverse reactions have been reported in male and female adolescents: premature closure of bony epiphyses with termination of growth." (Actavis Pharma, Inc., 2018). What this means is that testosterone applied to the adolescent will cause premature closure of the growth plates, stopping further gains in height in the growing individual, and ultimately making the person shorter than they otherwise would have been.

125. With respect to the cardiovascular system of men using ordinary doses, "Long-term clinical safety trials have not been conducted to assess the cardiovascular outcomes of testosterone replacement therapy in men." (Actavis Pharma, 2018). No FDA related clinical safety trials of any kind have been performed for women or adolescent girls, to my knowledge.

126. "There have been postmarketing reports of venous thromboembolic events [blood clots], including deep vein thrombosis (DVT) [blood clot of the extremity such as the leg] and pulmonary embolism (PE) [blood clot of the lung which may be deadly], in patients using testosterone products, such as testosterone cypionate." (Actavis Pharma, 2018).

127. A very recently published study of adverse drug reactions (ADRs) as part of gender affirmative hormone therapies in France states that "[o]ur data show a previously unreported, non-negligible proportion of cases indicating cardiovascular ADRs in transgender men younger than 40 years … In transgender men taking testosterone enanthate, all reported ADRs were cardiovascular events, with pulmonary embolism in 50% of cases." (Yelehe et al., 2022).

128. There are also serious concerns regarding liver dysfunction: "Prolonged use of high doses of androgens ... has been associated with development of hepatic adenomas [benign tumors], hepatocellular carcinoma [cancer], and peliosis hepatis

[generation of blood-filled cavities in the liver that may rupture] —all potentially life-threatening complications." (Actavis Pharma, 2018).

a. Hyperandrogenism

129. Hyperandrogenism is a medical condition of elevated blood androgens such as testosterone. As an endocrinologist, I frequently evaluate patients to determine if they have the condition of hyperandrogenism. Hyperandrogenism in the female or male is harmful and can lead to various maladies.

130. In order to diagnose hyperandrogenism, a laboratory blood test of testosterone is done. In hyperandrogenism, one will find testosterone levels elevated above the reference range.

131. For example, for females aged 18 or older, the normal reference range is 2-45 ng/dL. (Quest testosterone, 2023).[10] However, in female disease conditions these levels can be much higher. Levels above this normal reference range are considered hyperandrogenism. (Figure 3).

[10] For females aged 11-17 the reference range is <= 40 and below this age group, the range is even lower.

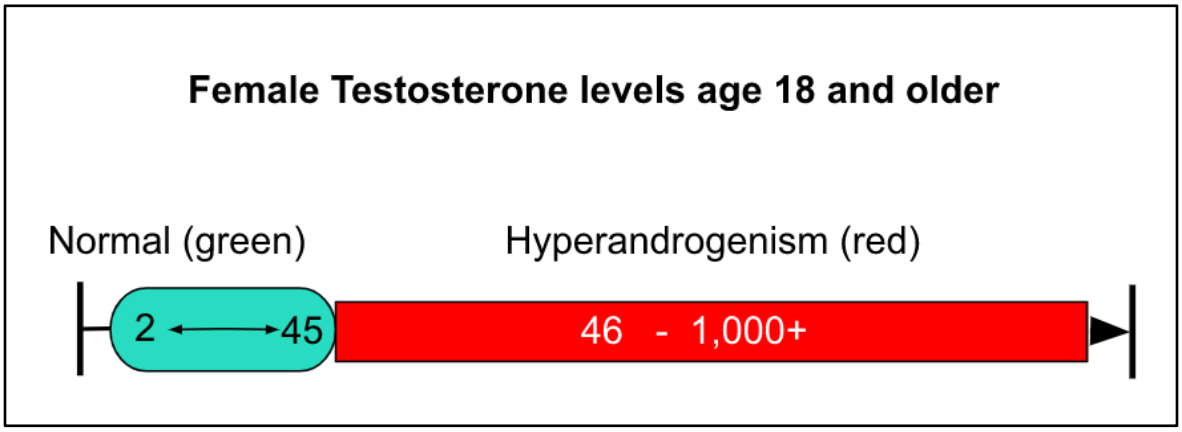

Figure 3

132. For example, in polycystic ovarian syndrome levels may range from 50 to 150 ng/dL.

133. I frequently diagnose and treat the hyperandrogen condition called polycystic ovarian syndrome (PCOS). These patients have elevated testosterone levels. These levels are mildly to moderately elevated and may range from 50-150. Hyperandrogenism found in PCOS has been associated with insulin resistance (Dunaif, 1989), metabolic syndrome (Apridonidze, 2005) and diabetes (Joham, 2014).

134. I also evaluate patients to rule out rare androgen-producing tumors that generate very high levels of testosterone. These rare endocrine tumors can cause severely elevated testosterone levels in the 300-1000 range. Once the cause of a hyperandrogen condition is identified, treatments may be put in place to help bring the testosterone levels down to the normal reference range.

135. Recommendations from the Endocrine Society's clinical guidelines related to GAT are to ultimately raise female levels of testosterone to 320 to 1000

ng/dL, which is on the same order as dangerous endocrine tumors for women as described above. (Hembree, 2017). A simple calculation shows this level for the adult may be anywhere from 6 to 100 times higher than native female testosterone levels. In doing so, they are inducing severe hyperandrogenism. These extraordinarily high levels of testosterone are associated with multiple risks to the physical and mental health of the patient.

136. In the Endocrine Society's Guidelines there is no grading of evidence for the rationale of using such high supraphysiologic doses of opposite-sex hormones for the female or male. There seems to be an underlying assumption that because the person believes to be the opposite sex, they then acquire the sex-specific laboratory ranges of the opposite sex. "The root cause of this flaw in thinking about diagnostic ranges was exemplified in a response letter by Rosenthal et al. claiming that gender identity determines the ideal physiologic range of cross-sex hormone levels (5). Thus, a psychological construct, the 'gender identity', is imagined to affect physical reality and change a person's sex-specific laboratory reference ranges. This is clearly not the case, otherwise there would be no serious complications of high-dose androgen treatment in transgender males." (Laidlaw et al., 2021).

137. The following chart shows testosterone levels in the normal adult female range (blue), PCOS (gray), endocrine tumors (red), and gender affirmative therapy (orange) as part of female to male (FtM) transition. (Figure 4).

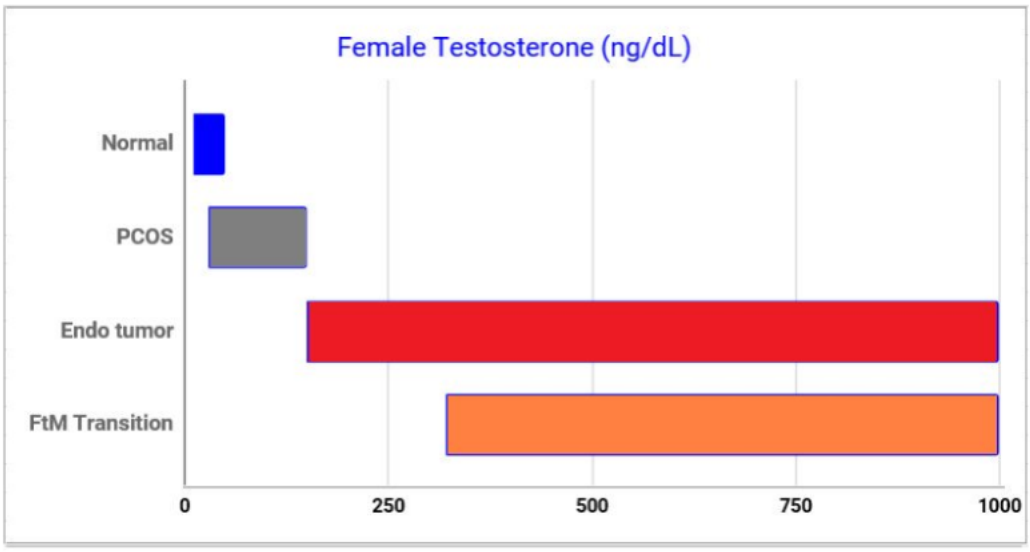

Image by Michael K Laidlaw. MD. Approximate total testosterone in ng/dL based on laboratory, etc. FtM transition from 2017 Endo Society Guidelines on Gender Dysphoria. With PCOS testosterone levels may be as high as 150. With endocrine tumors testosterone may be in the 150-1000 range. The recommendations of the Endocrine Society/WPATH are to bring levels into the 300-1000 range which is 6-100 times higher than normal endogenous adult female levels.

Figure 4.

b. Medical Problems Related to Hyperandrogenism

138. With respect to cardiovascular risk, "[s]tudies of transgender males taking testosterone have shown up to a nearly 5-fold increased risk of myocardial infarction relative to females not receiving testosterone." (Laidlaw et al., 2021; Alzahrani et al., 2019).

139. Permanent physical effects of testosterone therapy involve irreversible changes to the vocal cords. Abnormal amounts of hair growth which may occur on the face, chest, abdomen, back and other areas is known as hirsutism. Should the

female eventually regret her decision to take testosterone, this body hair can be very difficult to remove. Male pattern balding of the scalp may also occur. I would expect these changes to occur to the plaintiffs taking testosterone to induce hyperandrogenism. Common sense suggests that changes of voice and hair growth could be psychologically troubling should a patient decide to detranstition and attempt to reintegrate into society as female.

140. Changes to the genitourinary system due to hyperandrogenism include polycystic ovaries, clitoromegaly and atrophy of the lining of the uterus and vagina. (Hembree, 2017). The breasts have been shown to have an increase in fibrous breast tissue and a decrease in normal glandular tissue. (Grynberg et al., 2010). Potential cancer risks from high dose testosterone include ovarian and breast cancer. (Hembree, 2017). The effects on fertility of starting an adolescent on puberty blockers in early puberty (Tanner stage 2 or 3) and then adding opposite-sex hormones are unknown, but opposite-sex hormones are likely cytotoxic to the immature gonads. I would expect some or all of these effects to occur and risks to develop in natal females taking testosterone to induce hyperandrogenism.

141. According to research, anabolic steroid abuse[11] has been shown to predispose individuals towards mood disorders, psychosis, and psychiatric

[11] Anabolic steroid abuse involves the deliberate creation of hyperandrogenism in the body as a result of high doses of testosterone or other androgens.

disorders. The "most prominent psychiatric features associated with AAS [anabolic androgenic steroids, i.e. testosterone] abuse are manic-like presentations defined by irritability, aggressiveness, euphoria, grandiose beliefs, hyperactivity, and reckless or dangerous behavior. Other psychiatric presentations include the development of acute psychoses, exacerbation of tics and depression, and the development of acute confusional/delirious states." (Hall, 2005). Moreover, "[s]tudies... of medium steroid use (between 300 and 1000 mg/week of any AAS) and high use (more than 1000 mg/week of any AAS) have demonstrated that 23% of subjects using these doses of steroids met the DSM-III-R criteria for a major mood syndrome (mania, hypomania, and major depression) and that 3.4% — 12% developed psychotic symptoms." (Hall, 2005).

c. Erythrocytosis as a Result of Hyperandrogenism

142. I regularly monitor patients who are receiving testosterone to evaluate for erythrocytosis. Erythrocytosis is a condition of high red blood cell counts. Prolonged hyperandrogenism such as occurs with the use of testosterone at supraphysiologic levels can cause erythrocytosis.

143. Males and females have different reference ranges for red blood cells (measured as hematocrit). For example, the normal range of hematocrit for females over age 18 is 35.0-45.0% and males 38.5-50.0%. (Quest Hematocrit, 2023). Levels above this range signify erythrocytosis. (See Figure 5).

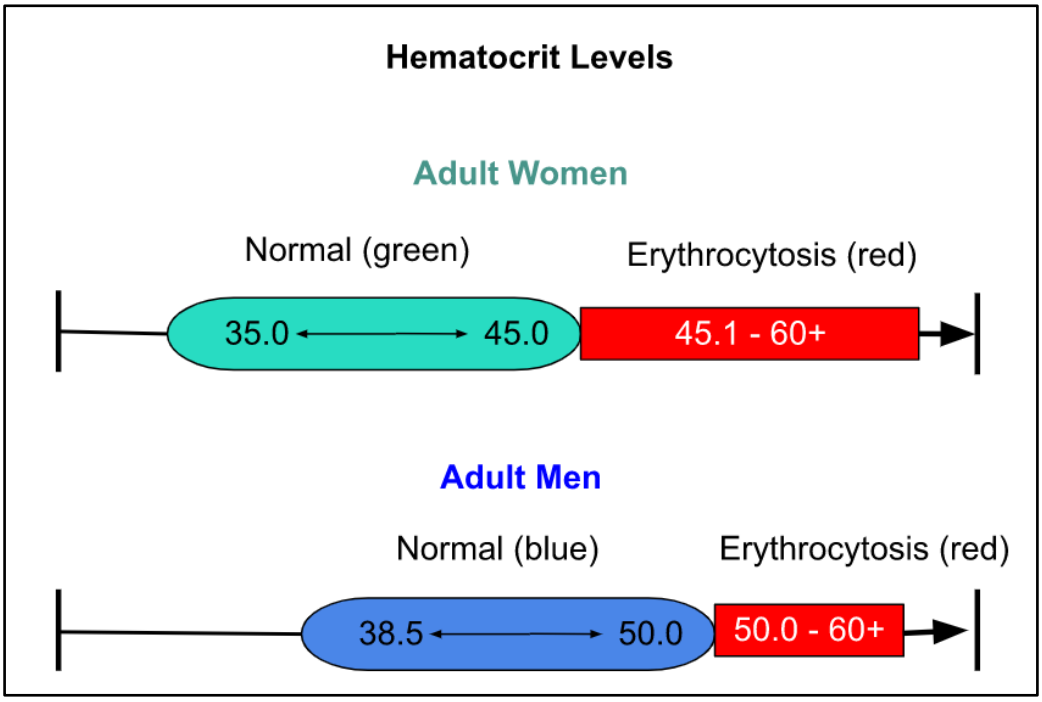

Figure 5.

144. As one can see, there is an overlap in the ranges of males and females such that levels between 45.1 and 50 are considered normal for the male. However, for the female these levels are considered erythroctotic. Levels above 50 for the male are considered erythrocytosis and for the female severe erythrocytosis.

145. The Madsen study was a "20-year follow-up study in [1,073] adult trans men who started testosterone therapy and had monitoring of hematocrit at our center." (Madsen, 2021). In this study, 24% of trans men had hematocrit levels 50% at some time which would be considered severe erythrocytosis. Unfortunately, they did not examine the hematocrit range of 45-50. However, one would presume that this would occur in at least the same percentage or higher as those who had developed severe erythrocytosis.

146. Any level of erythrocytosis in young women has been shown to be an independent risk factor for cardiovascular disease, coronary heart disease and death due to both. (Gagnon, 1994).

2. Estrogen

147. Estrogen is the primary sex hormone of the female. Prescription estrogen may be used if a woman has low estrogen levels due to premature failure of her ovaries. Estrogen is prescribed to bring these levels back into a normal range for the patient's age. Another labeled use of estrogen is to treat menopausal symptoms. The use of estrogen to treat pediatric age males is experimental.

148. Hyperestogenemia is a condition of elevated blood estrogens such as estradiol. I regularly evaluate patients for hyperestrogenemia in my practice. Hyperestrogenemia in the male is harmful and can lead to various maladies.

149. To diagnose hyperestrogenemia, a laboratory blood test of estrogen is performed. In hyperestrogenemia, one will find estrogen levels elevated above the reference range.

150. For example, in an adult male the normal estrogen reference range is 60-190 pg/mL. (Quest Estrogen, 2023). Levels above this range are consistent with hyperestrogenemia. (See Figure 6).

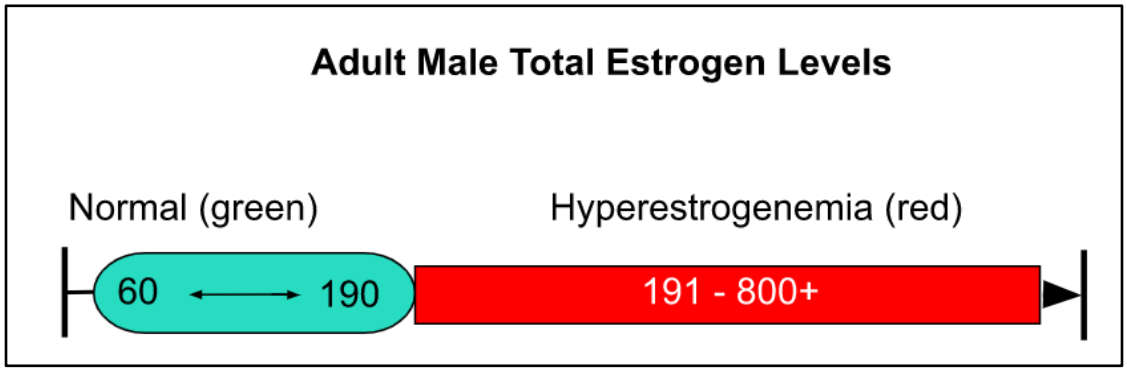

Figure 6.

151. There are medical conditions which can result in hyperestrogenemia. For example, "[t]he concentration of estrogen in cirrhotic patients is thought to increase by fourfold compared to individuals without cirrhosis." (Pagadala, 2023). Certain rare tumors, for example of the adrenal gland, can result in estrogen levels 3 to 10 fold higher than normal. (Cavlan, 2010).

152. In gender affirmative therapy, the medical condition of hyperestrogenemia is being deliberately, medically induced by the off-label use of high doses of estrogen. Endocrine Society Guideline recommends raising estradiol levels to 2 to 43 times above the normal range.[12] The high doses are used in an attempt to primarily affect an increase of male breast tissue development known as gynecomastia. Gynecomastia is the abnormal growth of breast tissue in the male. I evaluate and treat patients with gynceomastia. I have prescribed medication and have referred patients for surgery for this condition.

[12] Estradiol is a type of estrogen. Endocrine Society Guidelines recommend raising estradiol levels to 100-200 pg/mL. (Hembree, 2017). The normal adult male estradiol range is 7.7-42.6 pg/mL. (Labcorp Estadiol, 2023).

153. Other changes of secondary sex characteristics may develop because of hyperestrogenemia such as softening of the skin and changes in fat deposition and muscle development.

154. Long-term consequences of hyperestrogenemia include increased risk of myocardial infarction and death due to cardiovascular disease. (Irwig, 2018). Also, "[t]here is strong evidence that estrogen therapy for trans women increases their risk for venous thromboembolism[13] over 5 fold." (Irwig, 2018).

155. Breast cancer is a relatively uncommon problem of the male. However, the risk of a male developing breast cancer has been shown to be 46 times higher with high dose estrogen. (Christel et al., 2019).

156. Sexual dysfunction, including decreased sexual desire and decreased spontaneous erections, is another adverse effect of hyperestrogenemia. (Hembree, 2017).

3. Opposite-Sex Hormones and Infertility/Sterility

157. Dr. Shumer introduces the unproven idea that those adolescents who received puberty blockers in early puberty and then take opposite-sex hormones (which will lock them in early puberty) may be able at some point as adults stop the hormones and then advance through their normal physiologic puberty. He states, "If attempting fertility after previous treatment with GnRHa followed by hormone

[13] Venous thromboembolism is a blood clot that develops in a deep vein and "can cause serious illness, disability, and in some cases, death." (CDC, 2022).

therapy is desired, an adult patient would withdraw from hormones and allow pubertal progression. Assistive reproduction could be employed if needed. (T'Sjoen, et al., 2013)." (Shumer decl, par 83). However, the reference from T'Sjoen that Dr. Shumer provides describes treatment for natal females as merely theoretical: "*in theory*, there are three options available to preserve fertility: oocyte banking, embryo banking and banking of ovarian tissue." (T'Sjoen, et al., 2013) (emphasis added). For natal males, it is even worse, "[i]n trans women, the best option to preserve gametes is cryopreservation of sperm by preference initiated before starting hormonal therapy." (*Id.*) (emphasis added). By definition, in the early puberty of natal males, sperm are not being produced, therefore making sperm preservation as described by T'Sjoen impossible.

158. This is because the effects of starting an adolescent on puberty blockers in early puberty (Tanner stage 2 or 3) and then adding opposite-sex hormones on ultimate fertility are unknown. For example, let's take the case of a natal male who starts puberty blockers in early puberty, Tanner stage 2, at age 12. Let's say that person 1) continues puberty blocking medication through age 15, 2) begins estrogen at age 15[14], 3) continues estrogen through age 20, and 4) finally stops estrogen treatment and testosterone blockers. There is no evidence that, under those circumstances, this person will be able to produce an ejaculate with healthy, mature

[14] While also taking a medication to block testosterone, which is typically the case.

sperm capable of fertilization after discontinuing estrogen. I am not aware of any studies that have examined this type of situation.

D. Surgeries

159. The fourth stage of gender affirmative therapy is surgical alterations of the body of various kinds in an attempt to mimic features of the opposite sex. This is also important to note because transition surgeries, in particular mastectomies, are being performed on minors throughout the country.

160. Although the Georgia law at issue bans surgical GAT on minors, my understanding is that Plaintiffs are not seeking to challenge this part of the law. I nonetheless address the process and risks of gender affirmative surgeries because plaintiffs' experts discuss surgical treatment and because GAT advocates' approach to surgical intervention underscores the lack of rigor in their approach to GAT generally.

161. Dr. Shumer states that "The transition process in adolescence typically includes (i) social transition and/or (ii) medications, including puberty-delaying medication and hormone therapy." (Shumer decl, par 59). However, Dr. Shumer neglects to describe surgeries as a part of the transition process. This is important to note because, although endocrinologists like he and I do not typically perform surgery, we do refer patients for surgeries and need to be aware of the risks, benefits, complications, and long-term outcomes. This is also important to note because

transition surgeries, in particular mastectomies, are being performed on minors throughout the country.

162. Although endocrinologists do not typically perform surgery, we do refer patients for surgeries and need to be aware of the risks, benefits, complications, and long-term outcomes.

163. Individual surgical procedures can be a complex topic. It is helpful to first step back and consider conceptually what any surgery can and cannot accomplish.

164. In its basic form surgery is subtractive. In other words, a portion of tissue, an organ or organs are removed in order to restore health. For example, a diseased gallbladder may be surgically removed to help the patient get back to wellness. An infected appendix may be surgically removed to prevent worsening infection or even death. In both of these cases an unhealthy body part is surgically removed in order to restore health.

165. In some cases a diseased tissue or organ is removed so that a foreign replacement part may be substituted for an unhealthy organ or tissue. For example, a diseased heart valve may be replaced with a pig valve or a prosthetic heart valve. Another example is a failed liver may be replaced by liver transplant.

166. Though modern surgical techniques and procedures are astounding, there are very noteworthy limitations. Importantly, surgery cannot de novo create

new organs. If a person's kidneys fail, the surgeon has no scientific method for creating a new set of kidneys that can be implanted or grown within the patient. This conceptual background is helpful when considering various gender affirmative surgeries.

167. There are a variety of gender affirmative surgeries for females. These may include mastectomies, metoidioplasty, and phalloplasty.

1. Mastectomy

168. Mastectomies are the surgical removal of the breasts. The procedure is used in GAT in an attempt to make the chest appear more masculine. The surgery results in a permanent loss of the ability to breastfeed and significant scarring of 7 to 10 inches. The scars are prone to widening and thickening due to the stresses of breathing and arm movement. Other potential complications include the loss of normal nipple sensation and difficulties with wound healing. (American Cancer Society, 2022).

169. It is important to note that this operation cannot be reversed. The female will never regain healthy breasts capable of producing milk to feed a child. (Mayo Clinic, Top Surgery, 2022).

170. Another important consideration is that compared to the removal of an unhealthy gallbladder or appendix, in the case of gender dysphoria the breasts are

perfectly healthy and there is no organic disease process such as a cancer warranting their removal.

2. GAT Surgeries on the Male

171. GAT surgeries for the male include removal of the testicles alone to permanently lower testosterone levels. This is by nature a sterilizing procedure. Further surgeries may be done in an attempt to create a pseudo-vagina, which is called vaginoplasty. In this procedure, the penis is surgically opened and the erectile tissue is removed. The skin is then closed and inverted into a newly created cavity in order to simulate a vagina. A dilator must be placed in the new cavity for some time so that it does not naturally close.

172. Potential surgical complications may include urethral strictures, infection, prolapse, fistulas and injury to the sensory nerves with partial or complete loss of erotic sensation. (Mayo Clinic, Feminizing Surgery, 2022).

3. GAT Surgeries of the Female Pelvis and Genitalia

173. Other types of surgery for females include those of the genitalia and reproductive tract. For example, the ovaries, uterus, fallopian tubes, cervix and the vagina may be surgically removed. Removal of the ovaries results in sterilization.

174. Importantly, removing female body parts does not produce a male. Rather, the female has had sex specific organs permanently destroyed with no hope of replacement, while remaining biologically female.

175. There have also been attempts to create a pseudo-penis. This procedure is known as phalloplasty. It is not possible to de novo create a new human penis. Instead, a roll of skin and subcutaneous tissue is removed from one area of the body, say the thigh or the forearm, and transplanted to the pelvis. An attempt is made to extend the urethra or urinary tract for urination through the structure. This transplanted tissue lacks the structures inherent in the male penis which allow for erection, therefore erectile devices such as rods or inflatable devices are placed within the tube of transplanted tissue in order to simulate erection (Hembree, 2017). The labia may also be expanded to create a simulated scrotum containing prosthetic objects to provide the appearance of testicles.

176. Complications may include urinary stricture, problems with blood supply to the transplanted roll of tissue, large scarring to the forearm or thigh, infections including peritonitis, and possible injury to the sensory nerve of the clitoris. (Mayo Clinic, Masculinizing Surgery, 2022). A recent systematic review and meta-analysis of 1731 patients who underwent phalloplasty found very high rates of complications (76.5%) including a urethral fistula rate of 34.1% and urethral stricture rate of 25.4% (Wang, 2022).

E. GAT is Experimental Therapy

177. Gender affirmative therapy is experimental for at least two reasons:

1) The individual hormonal agents have not been subject to rigorous experimentation for their particular use cases; and

2) the spectrum of care of GAT encompassing some combination of social transition, puberty blocking medication, opposite-sex hormones, and surgeries of the reproductive system, breasts and face has never been properly tested in randomized controlled studies.

178. With respect to the first contention regarding the use case of hormones, consider the FDA approval of testosterone. The necessary testing of testosterone for FDA approval has only been performed on males. This is important, because the human species is sexually dimorphic. There is increasing recognition that the way that males and females react to medications are different because of inherent differences in physiology even down to the cellular level. (Deegan and Engal, 2019; Barus et al., 2022). However, one does not need to go down to the cellular level to understand that the normal reference ranges for testosterone in males and females are vastly different. As I have discussed, the adult male reference range for testosterone levels are approximately 300-1000 ng/dL, and the normal female levels are much lower at 10-50 ng/dL. Therefore, not only has testosterone not undergone rigorous testing by the FDA for females (as it was tested specifically male hormone replacement), but it has also never been tested at the exceedingly high levels recommended in GAT. This is an experimental use of testosterone that has never had equivalent FDA trials for approval and certainly not at the extremely high doses recommended by the Endocrine Society and WPATH.

179. Secondly, GAT advocates for multiple types of interventions employed over time—including social transition (which is a psychological intervention), puberty blockers (to stop normal adolescent pubertal development), opposite-sex hormones (at supraphysiologic dosages), and surgeries of the genitals and breasts. The grouping of one of these interventions with one or more of the others constitutes an experimental therapy group which has undergone no rigorous testing. Even a simply designed study comparing a group of gender dysphoric youth who are randomized to receive GAT compared to another group randomized to psychotherapy has to my knowledge never been attempted.

III. The Lack of Evidence Supporting Gender-Affirming Therapy

180. There is not a medical consensus supporting the use of puberty blockers and cross-sex hormones for the treatment of gender dysphoria in adolescents. In my opinion, there is insufficient evidence to conclude that any benefit of such treatment would outweigh the harm, particularly given the evidence of a rapid rise in cases of youth gender dysphoria, the high rates of coexisting mental health comorbidities, and naturally high rates of desistance.

A. The WPATH, The Endocrine Society, and Other Pro-Affirmation Organizations

181. Dr. Shumer cites the WPATH Standards of Care and the Endocrine Society's 2017 Guideline (ESG) stating that the "clinical practice guidelines and standards of care published by these organizations provide a framework for

treatment of gender dysphoria in adolescents." (Shumer decl, par 48). I will address each in turn.

1. WPATH

a. WPATH is an Advocacy Organization Primarily for Promoting Social and Political Activism

182. Dr. Massey is a member of WPATH, has worked on their "Standards of Care Revision" beginning in 2018, and is "a contributing author to the Adolescents chapter" for their Standards of Care 8. (WPATH website; Massey decl., par 7).

183. WPATH has functioned primarily as an advocacy organization for promoting social and political activism rather than as a strictly scientific organization. Unlike a scientific organization that must allow for internal debate to clarify issues of uncertainty, WPATH has actively sought to stymie such debate. As an example, Dr. Kenneth Zucker, whom I cited earlier, is a psychologist who led the Child Youth and Family Gender Clinic in Toronto, which was "one of the most well-known clinics in the world for children and adolescents with gender dysphoria." (Singal, 2016). He also led the group which wrote the DSM's gender dysphoria section. (*Id.*)

184. Dr. Zucker has been a longstanding member of WPATH. In fact, his work was cited 15 times in the 2012 WPATH Standards of Care 7. (Bazelon, 2022). Dr. Zucker discovered over the course of nearly forty years of clinical research "that

most young children who came to his clinic stopped identifying as another gender as they got older." (*Id.*).

185. Dr. Zucker was invited to speak to the USPATH's 2017 inaugural conference. During his presentation, protestors disrupted his talk and made demands of WPATH. "That evening, at a meeting with the conference leaders, a group of advocates led by transgender women of color read aloud a statement in which they said the 'entire institution of WPATH' was 'violently exclusionary' because it 'remains grounded in 'cis-normativity and trans exclusion.' The group asked for cancellation of Zucker's appearance on a second upcoming panel. Jamison Green, a trans rights activist and former president of WPATH, said the board agreed to the demand. 'We are very, very sorry,' he said." (Bazelon, 2022).

186. As an example of WPATH's one-sided political advocacy, consider also the recent inflammatory message by WPATH president Marci Bowers, MD in a letter to members. Writing about laws like Georgia's that seek to protect vulnerable minors from experimental procedures, Bowers wrote: "Ultimately, what terrifies conservatives most is that gender diversity is a force of nature that can no longer be contained by religious conscription or enforcement of a gender binary." Bowers concluded: "Anti-trans legislation needs to be fought with every voice, every thought, every inclination by all who know it. We need to make anti-trans legislation a losing political issue." (Bowers 2023). These statements are social-political

advocacy statements and rallying cries, not scientific arguments. They reduce any disagreement or concern regarding the safety and efficacy of GAT for minors to "anti-trans" religious-based bigotry, and they leave no space for those who are concerned that, based on current scientific knowledge, the risks of GAT for minors outweigh their known benefits. In my experience, these statements are sadly indicative of WPATH's primary role as a political and social advocacy organization, not a scientific one.

187. As for WPATH's Standards of Care 8 (SOC 8), these were published Sep. 6, 2022 (Coleman et al., 2022) and are endorsed by Dr. Shumer as an "expert consensus for clinicians related to medical care for transgender people, based on the best available science and clinical experience." (Shumer decl, par 49). However, there are multiple serious problems with this document such that any clinician who follows its recommendations puts his or her patients at great risk as I will explain.

b. WPATH SOC 8 Removed All Minimum Age Guidelines for Hormones and Surgeries

188. In a correction to the SOC 8, all guidelines for minimum age of opposite-sex hormones were removed (Correction IJTH, 2022). All guidelines for minimum age of surgery were also removed, meaning a minor of any age could be referred for any of the GAT surgeries listed previously (*Id.*).

189. The correction reads: "On page S258, the following text was removed:

'The following are suggested minimal ages when considering the factors unique to the adolescent treatment time frame for gender-affirming medical and surgical treatment for adolescents, who fulfil all of the other criteria listed above.

– Hormonal treatment: 14 years
– Chest masculinization: 15 years
– Breast augmentation, Facial Surgery: 16 years
– Metoidioplasty, Orchiectomy, Vaginoplasty,
– Hysterectomy, Fronto-orbital remodeling: 17 years
– Phalloplasty: 18 years'" (WPATH SOC 8 Correction, p. S261).

190. Of great concern is that the minimum age recommendations were retracted, it appears, in contradiction to the recommendation of their own expert consensus:

"On page S66, the following text was removed:

'Age recommendations for irreversible surgical procedures were determined by a review of existing literature and the expert consensus of mental health providers, medical providers, and surgeons highly experienced in providing care to TGD adolescents.'" (WPATH SOC 8 Correction, p. S260, emphasis added).

191. Naturally, to remove age limits for hormones and surgeries which have life-altering physical consequences should be done with the primary goal of obtaining the best possible health outcome for each patient. This should also be done

with solid research and long-term studies justifying these treatments for young, developing persons.

192. However, WPATH's own statements show that liability and politics were their primary motivations. According to SOC 8 author Dr. Tishleman, the changes were made in order to help ensure that doctors would not be liable for malpractice suits if they deviated from their new standards. (Davis, 2022). Additionally, WPATH's president said that to "propose" surgeries at newly set lower age recommendations would necessitate a "better political climate." (Ghorayshi, 2022).

c. WPATH SOC 8 Misuses the GRADE Approach for Systematic Reviews, Invalidating Their Recommendations

193. The SOC 8 also used an aberrant form of the GRADE approach for systematic reviews. The GRADE system, if used properly, "offers a transparent and structured process for developing and presenting evidence summaries for systematic reviews and guidelines in health care." It also provides "clinicians and patients with a guide to using" the developed "recommendations in clinical practice" through a "transparent and structured process." (Guyatt et al, 2021). In so doing GRADE offers a method to rate both 1) the quality of evidence and 2) the strength of recommendations in clinical guidelines, which are the two key components of the grading system. (*Id.*)

194. With respect to the strength of the recommendations, the GRADE guidelines state that there are two types: "Recommendations are characterized as [1] strong or [2] weak ... according to the quality of the supporting evidence and the balance between desirable and undesirable consequences of the alternative management options."

195. For any recommendations there are four possible categories of evidence quality, and these may be combined with two different strengths of recommendation (strong or weak). This means that for any recommendation there are eight possible combinations of evidence quality combined with recommendation strength.

196. SOC 8 did not follow the GRADE approach in ranking the quality of evidence independently from the strength of a recommendation. Instead, any recommendation of "we recommend" (a strong recommendation) was automatically assigned as "high" quality evidence. Likewise, any recommendation of "we suggest" (a weak recommendation) was automatically assigned as having "weaknesses of the evidence base." (Coleman et al., S250). The end effect is that instead of eight possible outcomes for any recommendation, there were only two: a strong recommendation paired with "high" quality evidence (as determined by WPATH)

and a weak recommendation based on low quality evidence. The GRADE authors specifically recommend against such modifications.[15]

197. Because SOC 8 did not rank the quality of evidence based on four rankings, they modified GRADE and subverted its utility in providing a transparent method for understanding the authors' evaluation of the evidence. Their alteration of the recommendation system may lead readers to believe that every strong recommendation has been backed by high quality evidence. SOC 8 also failed to provide evidence profile tables which should include "an explicit judgment of each factor that determines the quality of evidence for each outcome." (Guyatt et al., 2021). Clinicians should understand that SOC 8 represents a set of recommendations designed by an advocacy group which wishes to both promote GAT as widely as possible and to obscure the low to no quality evidence base of GAT.

d. WPATH's Chapter on the Eunuch Gender Identity Invalidates Gender Identity as a Biological Property

198. Another concerning component of SOC 8 is a new chapter regarding eunuchs that gives recommendations for how to induce hypogonadism in men who have the eunuch "gender identity"[16] by either orchiectomy (testicle removal) or

[15] From the GRADE guidelines: "Some organizations have used modified versions of the GRADE approach. We recommend against such modifications because the elements of the GRADE process are interlinked because modifications may confuse some users of evidence summaries and guidelines, and because such changes compromise the goal of a single system with which clinicians, policy makers, and patients can become familiar" (Guyatt et al., 2011).

[16] The notion that there is a "eunuch gender identity" further invalidates the gender identity as a serious biological property of human beings: "Many eunuch individuals see their status as

chemical castration such as with GnRH analogues (Coleman et al., 2022).[17] The notion that there is a "eunuch gender identity" further invalidates gender identity as a serious biological property of human beings: "Many eunuch individuals see their status as eunuch as their distinct gender identity with no other gender or transgender affiliation." (Coleman et al., 2022, p. S88)

199. For at least the reasons above, in my professional opinion WPATH SOC 8 is the work of advocacy, not science, and should not be followed by any physician, mental health care provider, or other medical professionals.

2. The Endocrine Society

200. As for the Endocrine Society Guideline (ESG), it is notable that the Endocrine Society itself never claimed that its guidelines should be considered standard of care. In fact, quite the opposite. The Endocrine Society (ES) states that its "guidelines cannot guarantee any specific outcome, nor do they establish a standard of care." (Hembree et al, 2017, p. 3895, emphasis added).

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eunuch as their distinct gender identity with no other gender or transgender affiliation" (Coleman et al., 2022, p. S88).

[17] "Treatment options for eunuchs to consider include:

- Hormone suppression to explore the effects of androgen deficiency for eunuch individuals wishing to become asexual, nonsexual, or androgynous;
- Orchiectomy [testicle removal] to stop testicular production of testosterone;
- Orchiectomy with or without penectomy to alter their body to match their self-image;
- Orchiectomy followed by hormone replacement with testosterone or estrogen." (*Id.*)

201. Nine out of ten authors of the Endocrine Society Guideline were members of WPATH or worked on WPATH's scientific committees. According to WPATH's website, seven of those nine had at some time been in WPATH leadership, including the WPATH presidency and board of directors.

202. With respect to the ESG, the quality of evidence for gender affirmative treatment of adolescents is rated "very low-quality evidence" and "low quality evidence." "The quality of evidence for [puberty blocking agents] is noted to be low. In fact, all of the evidence in the guidelines with regard to treating children/adolescents by [gender affirmative therapy] is low to very low because of the absence of proper studies." (Laidlaw et al., 2019).

203. Unlike some other recommendations for adolescent GAT, the Endocrine Society's guidelines do not include any grading of the quality of evidence specifically for their justification of laboratory ranges of testosterone or estrogen or for adolescent mastectomy or other surgeries.

204. Endocrinologists William Malone and Paul Hruz and other colleagues have written critically of the Endocrine Society's guidelines: "Unlike standards of care, which should be authoritative, unbiased consensus positions designed to produce optimal outcomes, practice guidelines are suggestions or recommendations to improve care that, depending on their sponsor, may be biased. In addition, the ES claim of effectiveness of these interventions is at odds with several systematic

reviews, including a recent Cochrane review of evidence, and a now corrected population-based study that found no evidence that hormones or surgery improve long-term psychological well-being. Lastly, the claim of relative safety of these interventions ignores the growing body of evidence of adverse effects on bone growth, cardiovascular health, and fertility, as well as transition regret." (Malone et al., 2021) (footnotes omitted).

205. In June of 2022, the Endocrine Society published "Enhancing the Trustworthiness of the Endocrine Society's Clinical Practice Guidelines.'' (McCartney et al., 2022). It wrote: "In an effort to enhance the trustworthiness of its clinical practice guidelines, the Endocrine Society has recently adopted new policies and more rigorous methodologies for its guideline program." (*Id.*) The document relates that in 2019, the ECRI Guidelines Trust "asked the Society for permission to include its guidelines in the ECRI Guidelines Trust database." However, after an evaluation by ECRI, the guideline related to osteoporosis "was the only guideline for which all recommendations were based on verifiable systematic evidence review with explicit descriptions of search strategy, study selection, and evidence summaries." (*Id.*). It follows that the recommendations from the ESG on Gender Dysphoria/Gender Incongruence were not all recommendations "based on verifiable systematic evidence review with explicit descriptions of search strategy, study selection, and evidence summaries."

206. Furthermore, the ESG was highly subject to conflicts of interest. As related earlier, nine out of the 10 authors were members or worked on the scientific committees of the advocacy group WPATH. Additionally, WPATH was a cosponsoring organization of the 2017 Guideline. The "Enhancing Trustworthiness" article recommends the opposite composition of authors for guidelines: "A majority (>50%) of non-Chair GDP members must be free of relevant C/DOI [conflict/duality of interest]." (McCartney et al., 2022).

207. Further problems with the ESG are highlighted in a recent BMJ Investigation article. It reads: "Guyatt, who co-developed GRADE, found 'serious problems' with the Endocrine Society guidelines, noting that the systematic reviews didn't look at the effect of the interventions on gender dysphoria itself, arguably 'the most important outcome.' He also noted that the Endocrine Society had at times paired strong recommendations—phrased as 'we recommend'—with weak evidence. In the adolescent section, the weaker phrasing 'we suggest' is used for pubertal hormone suppression when children 'first exhibit physical changes of puberty'; however, the stronger phrasing is used to 'recommend' GnRHa treatment. 'GRADE discourages strong recommendations with low or very low-quality evidence except under very specific circumstances,' Guyatt told the BMJ. Those exceptions are 'very few and far between.'" (Block, 2023).

208. It is clear that with respect to the subject of gender dysphoria, the Endocrine Society has not acted as an independent medical society generating its own scientific opinions. In my opinion, the Endocrine Society's Guideline on gender dyshphoria does not provide a standard of care (as they freely admit) that any physician is obligated to follow.

B. Systematic Reviews of the Evidence Do Not Show that GAT is Safe and Effective

209. Dr. McNamara claims that GAT is "safe and effective" and that adolescents will "thrive" based on a "solid body of evidence." (McNamara decl, par 62). Dr. Shumer claims that "GnRHa [puberty blocker], prescribed for delaying puberty in transgender adolescents, is both a safe and effective treatment." Shumer decl, par 79). He also claims that the testosterone and estrogen as used in GAT are supported by "robust research and clinical experience, which consistently demonstrate safety and efficacy." (Shumer decl, par 47). Dr. Massey claims that GAT treatments are "Safe and Effective Treatments for Gender Dysphoria." (Massey decl, par 30 heading).

210. However, systematic reviews of the body of evidence have shown that the evidence that Drs. Shumer, McNamara, and Massey vouch for is entirely lacking. For example, the NICE evidence review of October 2020 was commissioned by NHS England and aimed "to assess the evidence for the clinical effectiveness, safety and cost-effectiveness of gender-affirming hormones for children and adolescents

aged 18 years or under with gender dysphoria." (Nice, 2020). They concluded that there was "limited evidence for the effectiveness and safety of gender affirming hormones in children and adolescents with gender dysphoria" and that the long-term safety profile of these treatments are "largely unknown." (*Id.*). With respect to the safety of GnRHa (puberty blockers) they stated "[a]ll the studies that reported safety outcomes provided very low certainty evidence." (NICE, 2020).

211. The Florida Agency for Health Care Administration requested a report from two experts in the field of health methodology who specialize in evidence synthesis to support decision making (Brignardello-Petersen and Wiercioch, 2022). Their expert report regarding the body of evidence for GAT concluded that "there is great uncertainty about the effects of puberty blockers, cross-sex hormones, and surgeries," and that there was not sufficient evidence to support whether or not to use these interventions. (*Id.*).

C. Retraction of the Flawed Bränström Study Conclusion

212. A major correction was issued by the American Journal of Psychiatry. The authors and editors of a 2020 study, titled "Reduction in mental health treatment utilization among transgender individuals after gender-affirming surgeries: a total population study." (Bränström study, 2020) retracted their original primary conclusion. Letters to the editor by twelve authors including myself led to a reanalysis of the data and a corrected conclusion stating that in fact the data showed

no improvement in mental health for transgender identified individuals after surgical treatment, nor was there improvement with opposite-sex hormones ("Correction," 2020; Van Mol et al., 2020).

213. In the letter to the editor which I co-wrote with former Chairman of Psychiatry at Johns Hopkins Medical School, Paul McHugh, MD, we noted key missing evidence in the original Branstrom report when compared to the previous body of knowledge yielded from the Swedish Dhejne study. We wrote that "[t]he study supports only weak conclusions about psychiatric medication usage and nothing decisive about suicidality. In overlooking so much available data, this study lacks the evidence to support its pro gender-affirmation surgery conclusion." (Van Mol, Laidlaw, et al., 2020).

214. In another letter, Professor Mikael Landen writes that "the authors miss the one conclusion that can be drawn: that the perioperative transition period seems to be associated with high risk for suicide attempt. Future research should use properly designed observational studies to answer the important question as to whether gender-affirming treatment affects psychiatric outcomes." (Landen, 2020).

215. In another letter to the editor, psychiatrist David Curtis noted that "[t]he study confirms the strong association between psychiatric morbidity and the experience of incongruity between gender identity and biological sex. However, the Branstrom study does not demonstrate that either hormonal treatment or surgery has

any effect on this morbidity. It seems that the main message of this article is that the incidence of mental health problems and suicide attempts is especially high in the year after the completion of gender-affirming surgery." (Curtis, 2020).

216. In yet another critical letter, Dr. Agnes Wold states that "[w]hether these factors involve a causal relationship (i.e., that surgery actually worsens the poor mental health in individuals with gender dysphoria) cannot be determined from such a study. Nevertheless, the data presented in the article do not support the conclusion that such surgery is beneficial to mental health in individuals with gender dysphoria." (Wold, 2020).

D. High Rates of Completed Suicide and Psychiatric Complications in GAT

217. The most comprehensive study of GAT of its kind is from Sweden in 2011. The authors examined data over a 30-year time period. (Dhejne, 2011). The Dhejne team made extensive use of numerous Swedish database registries and examined data from 324 patients in Sweden over 30 years who had taken opposite-sex hormones and had undergone sex reassignment surgery. They used population controls matched by birth year, birth sex, and reassigned sex. When followed out beyond ten years, the sex-reassigned group had nineteen times the rate of completed suicides and nearly three times the rate of all-cause mortality and inpatient psychiatric care compared to the general population of Sweden.

218. Regarding the objective data I just described, some have argued that this data cannot be used to show definitively that GAT causes an increase in completed suicide and have referenced the study's principal author Dhejne's opinion in doing so. (Dhejne, 2017). I am in agreement. But neither does the study show that GAT leads to a decrease in completed suicide.

219. A principle of reviewing scientific studies is an awareness that a study provides 1) methods of how the study is conducted and 2) data resulting from the conduct of the study. Both of these sections of the study are intended to contain objective facts such that 1) anyone can interpret the data and critique the methods to obtain such data, and 2) anyone can repeat the study under similar conditions to see if they obtain similar results.

220. The study author's opinions (even Dhejne's) are simply that, opinions. They are a subjective interpretation of the data. They are subject to particular biases, as are anyone's opinions. In other words, the study's author's statement doesn't amount to science or preclude anyone else from forming a different or even opposite opinion.

221. What is generally not challenged is that a comprehensive study of 30 years' worth of data showed remarkably high rates of completed suicide, psychiatric hospitalization and mortality. The suicide rate was 19 times the general population in Sweden.

222. What we are left with are statistics that show very high rates of morbidity and mortality in spite of both hormonal and surgical interventions that are intended to prevent such occurrences. Given that suicide occurs in the context of psychological conditions, particularly depression, in my opinion, it is more likely that untreated psychological comorbidities, possibly compounded by negative psychological effects of high dose hormones and post operative regret, led to higher rates of completed suicide as compared to the general population. (Hirschfeld and Russel, 1997).

223. Dr. McNamara states that "[e]mpiric changes in measures of mental health changes are the most positive in studies that assess the effect of exogenous sex hormones such as estrogen and testosterone" in which she references a 2023 study by Chen et al. entitled "Psychosocial Functioning in Transgender Youth after 2 Years of Hormones." (McNamara decl, par 38).

224. However, the Chen study, rather than showing the safety and efficacy of opposite hormones, instead confirms the inherent danger of completed suicide found in the Dhejne study. This study included 315 adolescents aged 12 to 20 years old who were taking high dose hormones of the opposite sex[18]. Most concerningly,

[18] "[T]he US Department of Health and the Food and Drug Administration reference approximate age ranges for these phases of life, which consist of the following: (1) infancy, between birth and 2 years of age; (2) childhood, from 2 to 12 years of age; and (3) adolescence, from 12 to 21 years of age. Additionally, Bright Futures guidelines from the American Academy of Pediatrics identify adolescence as 11 to 21 years of age, dividing the group into early (ages 11–14 years), middle (ages 15–17 years), and late (ages 18–21 years) adolescence. The American

the authors report that 2 out of 315 subjects died by suicide. The authors also report "The most common adverse event was suicidal ideation" in 11 subjects.

225. There are also multiple methodological deficiencies and omissions of relevant data in the Chen study:

1) the study was not randomized and had no control group;
2) 315 participants were enrolled, however data was not available for almost one fifth of all possible observations;
3) neither the types of mental health conditions the subjects had at baseline and follow-up, nor the mental health care (if any) research subjects received preceding and during the study time frame were reported, nor were psychotropic medications and dosages reported;
4) neither the subjects' dosages of opposite sex hormones, nor the serum levels of these hormones, nor post-mortem hormone levels, were reported;
5) the findings from the deceased subjects autopsy reports were not reported.

226. Unfortunately, unlike the Dhejne study, the Chen study provides little other useful data about outcomes such as psychiatric hospitalizations, suicide attempts, or rates of comorbid psychiatric illness. The death by suicide of 2 out of 315 subjects equates to approximately 317 suicide deaths per 100,000 patient-years. If we compare this figure to that of the UK's largest gender identity service,

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Academy of Pediatrics has previously published a statement on the age limit of pediatrics in 1988, which was reaffirmed in 2012 and identified the upper age limit as 21 years with a note that exceptions could be made when the pediatrician and family agree to an older age, particularly in the case of a child with special health care needs. Recent research has begun to shed more light on the progression of mental and emotional development as children progress through the adolescent years into young adulthood. It is increasingly clear that the age of 21 years is an arbitrary demarcation line for adolescence because there is increasing evidence that brain development has not reliably reached adult levels of functioning until well into the third decade of life." (Hardin, 2017).

Tavistock, the "annual suicide rate is calculated as 13 per 100,000" patient-years. (Biggs, 2021). The death-by-suicide rate was approximately 24 times higher in the Chen study compared to the much larger Tavistock Clinic. In fact, Professor Biggs reports that two of the four suicide deaths from the Tavistock data were of patients who were on the waiting list and "would not have obtained treatment." (*Id*.). This strongly suggests that the use of high dose opposite-sex hormones in the Chen study was associated with a much higher death rate.

227. The NIH produced the consent forms related to this study pursuant to a FOIA request my colleague submitted. I have reviewed them. Unfortunately, of the many side effects of hormone therapy listed on the study's consent forms, death by suicide (or by any cause) is not listed and was not disclosed to participants. (Olson-Kennedy consent forms, 2014).

228. Finally, even after the suicide deaths of two young people and observing that "[t]he most common adverse event was suicidal ideation" in 11 subjects, there was no comparison of suicidal ideation before and after receiving hormones. (Chen et al., 2023). The principal investigator of the study, Dr. Johanna Olson-Kennedy, submitted a grant application to the NIH in 2014 and was awarded $5.7 million over 5 years in part to answer just that question. (NIH RePorter, 2023). In the section entitled "Specific aims", the authors wrote: "Hypothesis 2a: Patients treated with cross-sex hormones will exhibit decreased symptoms of gender

dysphoria, depression, anxiety, trauma symptoms, self-injury, and suicidality and increased body esteem and quality of life over time." (Olson-Kennedy grant application, 2014, p. 163) (emphasis mine). This is important short-term information needed to help determine if hormones in GAT provide relief to young people who at baseline have a high risk of suicidal ideation, however the study authors neglected to provide this critical information.

229. All of the data collected to date in Dr. Olson-Kennedy's publicly funded study the "The Impact of Early Medical Treatment in Transgender Youth" should be released to the public so that other researchers and clinicians can determine how puberty blockers, opposite-sex hormones, and mastectomy surgeries affect adolescent physical and mental health.

230. So, while it is true that patients suffering from gender dysphoria have higher rates of suicidal ideation and completed suicide than the general population, studies have not definitively shown that providing hormones reduces rates of suicide, and in fact those interventions may be associated with increased rates.

231. With respect to general suicide risk in mental healthcare, psychotherapy has been successfully employed to reduce such risk. As an example, in a systematic review of the effectiveness of psychotherapy on suicidal outcomes, it was found that in twenty-three assessed studies, there was a "decrease of suicidal ideation rates in 95.7% of them." (Méndez-Bustos et al., 2019). With respect to suicide attempts,

seventeen studies were examined and 88.2% showed positive (good) results. (*Id.*). Given that a high percentage of adolescents have comorbid psychiatric conditions in association with gender dysphoria, a reasonable approach to treating these young people (and avoiding the harms of hormones and surgeries) would be to employ such psychotherapeutic approaches.

E. An Increase in Cases of Gender Dysphoria

232. Gender dysphoria has been a relatively rare condition in children and adolescents. However there have been very significant increases in referrals for this condition noted around the globe.

233. For example, in the UK, "The number of referrals to GIDS [Gender Identity Development Service] has increased very significantly in recent years. In 2009, 97 children and young people were referred. In 2018 that number was 2519." (Bell v Tavistock Judgment, 2020). There is evidence that this increase may be in part due to social contagion and fueled by social media/internet use. (Littman, 2018).

234. The French National Academy of Medicine wrote recently: "Parents addressing their children's questions about transgender identity or associated distress should remain vigilant regarding the addictive role of excessive engagement with social media, which is both harmful to the psychological development of young people and is responsible for a very significant part of the growing sense of gender incongruence." (SEGM, 2022).

235. In "a study of the Finnish gender identity service, '75% of adolescents [assessed] had been or were currently undergoing child and adolescent psychiatric treatment for reasons other than gender dysphoria' (Kaltiala-Heino, 2015). In fact, '68% had their first contact with psychiatric services due to other reasons than gender identity issues.' The same study also showed that 26% percent had an autistic spectrum disorder and that a disproportionate number of females (87%) were presenting to the gender clinics compared to the past." (Laidlaw in gdworkinggroup.org, 2018).

F. Desistance

236. Desistance is a term indicating that the child, adolescent, or adult who initially presented with gender incongruence has come to experience a realignment of their internal sense of gender and their physical body. "Children with [gender dysphoria] will outgrow this condition in 61% to 98% of cases by adulthood. There is currently no way to predict who will desist and who will remain dysphoric." (Laidlaw et al., 2019; Ristori & Steensma, 2016).

237. Because there is no physical marker to diagnose gender dysphoria, and because it is not possible to predict which child or adolescent will desist, it is not possible to know which young person will remain transgender identified as adults. Also, because the rate of desistance is so high, gender affirmative therapy will

necessarily cause serious and irreversible harm to many children and adolescents who would naturally outgrow the condition if not affirmed.

238. Dr. Shumer states that "the majority of prepubertal children exploring their gender ... are not expected to become transgender adolescents or adults." (Shumer decl, par 61). He contrasts this with those whose children undergoing pubertal development and also have gender incongruence, stating that they "are highly likely to be transgender." (*Id.*) However, Dr. Shumer's statement is contradicted by the evidence from the following studies.

239. Puberty, which pertains to the physical development of the reproductive tract, breasts, and associated secondary sex characteristics, can begin as early as age 8 in girls and age 9 in boys. The studies which have examined desistance involved adolescents and children aged twelve and under. For example, table 1 in Ristori and Steensma 2016 shows multiple studies involving minors. For the three most recent—Singh (2012), Wallien & Cohen-Kettenis (2008), and Drummond et al. (2008)—these involved age ranges from 3 to 12 years old.[19] The desistance rate varied from 61 to 88%. Since the upper age was twelve, this would include children in the age

[19] "This study provided information on the natural histories of 25 girls with gender identity disorder (GID). Standardized assessment data in childhood (mean age, 8.88 years; range, 3-12 years)." (Drummond et al., 2008). "We studied 77 children who had been referred in childhood to our clinic because of gender dysphoria (59 boys, 18 girls; mean age 8.4 years, age range 5-12 years)." (Wallien et al., 2008). "Standardized assessment data in childhood (mean age, 7.49 years; range, 3–12 years) and at follow-up (mean age, 20.58 years; range, 13–39 years) were used to evaluate gender identity and sexual orientation outcome. At followup, 17 participants (12.2%) were judged to have persistent gender dysphoria." (Singh, 2012).

range of 8-12 years old, many of whom were already going through puberty based a knowledge of the ages of initiation of puberty and were therefore not pre-pubertal.[20] Therefore, we can see that it is likely that some portion of adolescents in early puberty do in fact desist, contrary to what Dr. Shumer has stated. At the very least, Dr. Shumer's claim that these children "are highly likely to be transgender" is not supported by these studies. (Shumer decl, par 61).

G. Mastectomy Surgery for Minors

240. Any serious look at long-term effects of surgical treatment would follow subjects out at least ten years. For example, an article was published examining patients who had mild calcium disorders due to a gland called the parathyroid. They compared a group of patients who had surgical removal of the parathyroid to a control group who had not. They examined data ten years after surgery was completed and concluded that parathyroid surgery in this group "did not appear to reduce morbidity or mortality" in that patient group. (Pretorius, 2022).

241. To my knowledge there exists no comparable studies of minors with gender dysphoria comparing those who had mastectomy surgery to a control group who had not. There are also no known studies of minors followed for 10 years or

[20] To my knowledge the desistance literature does not examine Tanner stages of puberty as part of their studies. However, one can infer based on the ages that many children had at least begun puberty (Tanner stage 2) or were at a more advanced stage of puberty.

more to determine the long-term risks and benefits of mastectomy for gender dysphoria.

242. Good quality studies specifically showing that mastectomy surgery is safe, effective, and optimal for treating minors with gender dysphoria do not exist. For example, there is a study titled "Chest Reconstruction and Chest Dysphoria in Transmasculine Minors and Young Adults Comparisons of Nonsurgical and Postsurgical Cohorts." (Olson-Kennedy, 2018). The study authors conclude that "[c]hest dysphoria was high among presurgical transmasculine youth, and surgical intervention positively affected both minors and young adults." However, there are a number of problems with this study. First, the term "chest dysphoria" is a creation of the study authors and is not found as a diagnosis or even referenced in the DSM-5. Second the "chest dysphoria scale" is a measuring tool created by the authors, but which the authors state "is not yet validated." (*Id*., p. 435) Third, the mastectomies were performed on girls as young as 13 and 14 years old and who thereby lacked the maturity and capacity of good judgment for truly informed consent for this life altering procedure. For this reason, in my professional opinion, the research and surgeries performed were flawed and unethical.

243. There exists another poorly designed study which suffers from similar methodological and ethical problems as the Olson-Kennedy study. A 2021 study published in Pediatrics examined females aged 13-21 recruited from a gender clinic.

Thirty young females had mastectomy procedures and sixteen had not. The average age at surgery was 16.4 years. (Mehringer, 2021). The follow-up time after surgery was only 19 months, and no data is provided or analyzed about key psychiatric information such as comorbid psychological illnesses, self-harming behaviors, psychiatric hospitalizations, psychiatric medication use, or suicide attempts.

244. Information returned from the study surveys were all qualitative and included responses such as "[My chest dysphoria] made me feel like shit, honestly. It made me suicidal. I would have breakdowns." Another respondent stated, "I've been suicidal quite a few times over just looking at myself in the mirror and seeing [my chest]. That's not something that I should have been born with." (Mehringer, 2021). The omission of psychiatric data is a major flaw in the study and also irresponsible given the obviously dangerous psychological states that some of these young people were in.

245. Since such a high proportion of subjects were using testosterone (83%), some of the responses could be attributed to adverse effects of testosterone. For example, as related earlier, high dose testosterone can manifest in irritability and aggressiveness. One study subject responded, "I get tingly and stuff and it kind of makes me want to punch something." (Mehringer, 2022).

246. The testosterone labeling also indicates nausea and depression as adverse reactions which are described by another study subject: "There's a feeling

of hopelessness, of desperation, of—almost makes me feel physically sick." (Actavis Pharma, Inc., 2018; Mehringer, 2022).

247. The study appears to have been designed, at least in part, to justify insurance companies paying for mastectomy procedure for minors with GD, even though they have provided no long-term statistical evidence of benefit: "These findings...underscore the importance of insurance coverage not being restricted by age." (Mehrniger, 2021). This also appears to be part of the aim of the flawed Olson-Kennedy study, which stated "changes in clinical practice and in insurance plans' requirements for youth with gender dysphoria who are seeking surgery seem essential." (Olson-Kennedy, 2018). So these two studies, rather than being a thorough examination of the psychological and physical risks and benefits of mastectomy surgery over the long-term appear instead to exist, at least in part, to validate the need for insurance companies to insure the costs of these dubious procedures for minors.

H. Centers for Medicare and Medicaid Services

248. The Centers for Medicare and Medicaid Services ("CMS") has found "inconclusive" clinical evidence regarding gender reassignment surgery. Specifically, the CMS Decision Memo for Gender Dysphoria and Gender Reassignment Surgery (CAG-00446N) (June 19, 2019) states: "The Centers for Medicare & Medicaid Services (CMS) is not issuing a National Coverage Determination (NCD) at this time on gender reassignment surgery for Medicare beneficiaries with gender dysphoria because the clinical evidence is inconclusive for the Medicare population."

I. Nation and States Question and Reverse Course on GAT

249. Dr. McNamara states that, "The current version, WPATH Standards of Care Version 8, is viewed as authoritative in the medical community." (McNamara decl, par 18). However, numerous nations are questioning and reversing course on the WPATH/Endocrine Society's low-quality gender affirmative therapy guidelines. For example, in the *Bell v. Tavistock* Judgment in the UK, regarding puberty blockers used in GAT, the Court concluded that "there is real uncertainty over the short and long-term consequences of the treatment with very limited evidence as to its efficacy, or indeed quite what it is seeking to achieve. This means it is, in our view, properly described as experimental treatment." (*Bell v. Tavistock* Judgment, 2020) (emphasis added). The court's decision was not upheld on appeal, but the

reviewing court did not contradict this finding, either. (*Bell v Tavistock* Appeal, 2021).

250. Dr. Hilary Cass "was appointed by NHS England and NHS Improvement to chair the Independent Review of Gender Identity Services for children and young people in late 2020." (The Cass Review website, 2022). In her interim report dated February 2022, it states that "[e]vidence on the appropriate management of children and young people with gender incongruence and dysphoria is inconclusive both nationally and internationally." (Cass, 2022). This led to the shutting down of their Tavistock child gender identity clinic.

251. More recently, new guidance from NHS England, published on June 9, 2023, favors psychological therapy and support: "The primary intervention for children and young people who are assessed as suitable for The Service is psychosocial (including psychoeducation) and psychological support and intervention." Furthermore, if a patient had already been started on puberty blocking hormones outside of NHS protocol, then the puberty blockers would need to be stopped for a period of time to provide for baseline assessments to be performed by the NHS Service. If the patient is deemed appropriate to restart treatment, then it is a "requirement for the patient to be enrolled in the formal research protocol." (NHS England, 2023).

252. In the bulletin of the Royal College of Psychiatrists in 2021, a reevaluation of the evidence, Griffin and co-authors wrote, "As there is evidence that many psychiatric disorders persist despite positive affirmation and medical transition, it is puzzling why transition would come to be seen as a key goal rather than other outcomes, such as improved quality of life and reduced morbidity. When the phenomena related to identity disorders and the evidence base are uncertain, it might be wiser for the profession to admit the uncertainties. Taking a supportive, exploratory approach with gender-questioning patients should not be considered conversion therapy." (Griffin et al., 2021).

253. In 2020, Finland recognized that "[r]esearch data on the treatment of dysphoria due to gender identity conflicts in minors is limited," and recommended prioritizing psychotherapy for gender dysphoria and mental health comorbidities over medical gender affirmation. (Council for Choices in Healthcare in Finland, 2020). Additionally, "[s]urgical treatments are not part of the treatment methods for dysphoria caused by gender-related conflicts in minors." (*Id.*)

254. In 2021, Sweden's largest adolescent gender clinic announced that it would no longer prescribe puberty blockers or cross-sex hormones to youth under 18 years outside clinical trials (SEGM, 2021). "In December 2019, the SBU (Swedish Agency for Health Technology Assessment and Assessment of Social Services) published an overview of the knowledge base which showed a lack of

evidence for both the long-term consequences of the treatments, and the reasons for the large influx of patients in recent years. These treatments are potentially fraught with extensive and irreversible adverse consequences such as cardiovascular disease, osteoporosis, infertility, increased cancer risk, and thrombosis. This makes it challenging to assess the risk / benefit for the individual patient, and even more challenging for the minors or their guardians to be in a position of an informed stance regarding these treatments." (Gauffen and Norgren, 2021). In 2022, the SBU stated, "The scientific basis is not sufficient to assess effects on gender dysphoria, psychosocial conditions, cognitive function, body measurements, body composition or metabolism of puberty-inhibiting or gender-opposite hormone treatment in children and adolescents with gender dysphoria." (SBU, 2022). In 2023, a Swedish literature review concluded that the "long-term effects of hormone therapy on psychosocial and somatic health are unknown, except that GnRHa treatment seems to delay bone maturation and gain in bone mineral density." The study emphasized various methodological weaknesses and the lack of randomized controlled trials and long-term studies regarding the outcomes of GAT for gender dysphoria. (Ludvigsson, 2023).

255. In Norway, a report from the Norwegian Healthcare Investigation Board (Ukom) was released in March of this year. The report found "there is insufficient evidence for the use of puberty blockers and cross-sex hormone

treatments in young people, especially for teenagers who are increasingly seeking health services and being referred to specialist healthcare. Ukom defines such treatments as utprøvende behandling, or 'treatments under trial,' said Moen." (Block, "Norway", 2023).

IV. Specific Concerns regarding the Five Minor Plaintiffs

256. As stated previously, the majority of pediatric patients will desist from gender dysphoria by completion of puberty, unless active interventions such as social transition, puberty blockers, or opposite-sex hormones are used to convince the child that they may become the opposite sex. It is not clear that parents understand this reality. Had they proper understanding, they may not have chosen to have their child go down the gender affirmative therapy pathway.

257. For example, four of the plaintiffs appear to have been socially transitioned before the age of 13.[21] This occurred at a time when they were statistically likely to desist from feelings of gender incongruence if provided psychological support and not socially transitioned or, in some cases, later prescribed puberty blockers.[22]

258. Another concern with respect to the plaintiffs is that some may have a misunderstanding of natural puberty. They may not fully comprehend that puberty

[21] AK, TM, MV, and LZ all have declarations discussing early social transition. MK and TM were both prescribed puberty blockers.

[22] See section III.F.

blockers and opposite-sex hormones cannot cause a person to undergo puberty of the opposite sex.

259. For example, Mary Koe states that AK desires to "go through female puberty." (Koe decl, par 17). Hailey Moe states that TM "wants to go through female puberty." (Moe decl, par 11). Both AK and TM appear to have an unrealistic expectation about GAT. Natal male children like AK and TM cannot go through "female puberty" because these children lack ovaries, fallopian tubes, a uterus, a vagina and other female specific structures. Natal male children like AK and TM will never physically mature in such a way so as to be able to menstruate. Neither will they gain the natural capacity to ovulate to produce eggs capable of being fertilized by a sperm, which is one of the primary outcomes of female puberty. Anna Zoe states that LZ doesn't want to be "forced to undergo male puberty." (Zoe decl, par 24). Again, LZ has been socially transitioned as a child and is under the false impression that there is another option available other than going through natural male puberty. Rather than being helped psychologically to be comfortable in LZ's own body, LZ's school assisted with social transition. (Zoe decl, par 13).

VI. Conclusion

260. The gender affirmative therapy model suffers from serious deficiencies in logic and lacks scientific foundation. The deep error hidden in this model is that one cannot, in fact, change sex. One cannot acquire the deep characteristics of

biological sex in order to gain the complete sexual and reproductive functions of the opposite sex. This is not technologically possible.

261. Children and adolescents are of such immature minds that they are likely to believe that it is possible. In fact, they may come to believe that their inherent, biologically necessary puberty is "terrifying" or needs to be stopped. Social transition serves to convince the child or adolescent that they can be the opposite sex. Puberty blockers sustain this state of mind by retaining a childlike state with respect to the genitalia and body habitus. High-dose opposite-sex hormones then cause medical conditions such as hirsutism and irreversible damage to the vocal cords in females and gynecomastia in males. These conditions serve to convince the young person that they are going through puberty of the opposite sex when, in fact, they are not developing sexually and are infertile.

262. There are known risks for both adults and minors, some of which I have described above, including cardiovascular disease, cancer, deficiencies in ultimate bone density, harms to sexual function, infertility, and for some permanent sterility. The child or adolescent cannot consent to these harms when they are not mature enough to fully comprehend what they mean. Long-term studies regarding the treatment effects specifically for minors with hormones and surgeries, using randomized controlled studies or even proper observational studies, do not exist.

263. WPATH's SOC 8 represents a danger to minors, young adults, and adults and should not be followed by any physician, mental health care provider, or other medical professional.

264. For the reasons set forth above, in my professional opinion as an endocrinologist, no child or adolescent should receive supraphysiologic doses of opposite-sex hormones to attempt to alter secondary sex characteristics, nor should they have surgeries to remove or alter the breasts, genitalia or reproductive tracts as part of GAT. There exists insufficient evidence of benefit, but serious concerns for risk of harm. Therefore, I believe that the newly enacted SB 140 is based on sound medical principles for the protection of minors.

I declare, pursuant to 28 U.S.C. § 1746, under penalty of perjury that the foregoing is true and correct. Executed August 1, 2023.

/s/ Michael K. Laidlaw
Michael K. Laidlaw, M.D.

References

Actavis Pharma, Inc. Testosterone Cypionate injection. Actavis Pharma, Inc., 2018. Accessed May 17, 2023 via https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=d7b57b68-dca6-4df2-b3f2-7017d7b69f17&msclkid=4ed2db18cd5411ecba911bd6e4bded62

Alberts B, Johnson A, Lewis J, et al. "Sperm" in Molecular Biology of the Cell. 4th edition. New York: Garland Science; 2002.

Almazan AN, Keuroghlian AS. "Association Between Gender-Affirming Surgeries and Mental Health Outcomes". JAMA Surgery 2021; 156(7): 611–618.

Alzahrani T, Nguyen T, Ryan A, et al. "Cardiovascular disease risk factors and myocardial infarction in the transgender population". Circ Cardiovasc Qual Outcomes. 2019;12(4):e005597

The American Cancer Society medical and editorial team. "Mastectomy". American Cancer Society. https://www.cancer.org/cancer/breast-cancer/treatment/surgery-for-breast-cancer/mastectomy.html accessed 06/24/22

American Psychiatric Association. Diagnostic and statistical manual of mental disorders (5th ed., text rev.) 2022. https://doi.org/10.1176/appi.books.9780890425787

Anckarsäter, H., (MD, Ph.D.) and Gillberg, C., (M.D., Ph.D.) "Methodological Shortcomings Undercut Statement in Support of Gender-Affirming Surgery". Am J Psychiatry 2020; 177:764– 765; doi: 10.1176/appi.ajp.2020.19111117.

Anderson K, Krakowsky Y, Potter E, Hudson J, Cox AR. Adult transgender care: A review for urologists. Can Urol Assoc J. 2021 Oct;15(10):345-352. doi: 10.5489/cuaj.6949. PMID: 33750518; PMCID: PMC8525536.
Apridonidze T, Essah PA, Iuorno MJ, Nestler JE. "Prevalence and characteristics of the metabolic syndrome in women with polycystic ovary syndrome". J Clin Endocrinol Metab. 2005;90(4):1929. Epub 2004 Dec 28.

Arain, et al. Neuropsychiatric Disease and Treatment. "Maturation of the adolescent brain". Neuropsychiatric Disease and Treatment. 2013:9 449–461

Banikarim, C. “Primary Dysmneorrhea in Adolescents”. UpToDate. Feb 10, 2021.

Barus R, Bergeron S, Chen Y, Gautier S. Sex differences: From preclinical pharmacology to clinical pharmacology. Therapie. 2023 Mar-Apr;78(2):189-194. doi: 10.1016/j.therap.2022.10.005. Epub 2022 Oct 6. PMID: 36302696.

Bentler SE, Liu L, Obrizan M, Cook EA, Wright KB, Geweke JF, Chrischilles EA, Pavlik CE, Wallace RB, Ohsfeldt RL, Jones MP, Rosenthal GE, Wolinsky FD "The aftermath of hip fracture: discharge placement, functional status change, and mortality." Am J Epidemiol. 2009;170(10):1290. Epub 2009 Oct 4.

Bell & Mrs A v The Tavistock And Portman NHS Foundation Trust. Approved Judgment.[2020] EWHC 3274 (Admin) (01 December 2020). https://www.judiciary.uk/wp-content/uploads/2020/12/Bell-v-Tavistock-Judgment.pdf

Bell & Mrs A v The Tavistock And Portman NHS Foundation Trust. Appeal No. C1/2020/2142 (17 September 2021).

Bentler SE, Liu L, Obrizan M, Cook EA, Wright KB, Geweke JF, Chrischilles EA, Pavlik CE, Wallace RB, Ohsfeldt RL, Jones MP, Rosenthal GE, Wolinsky FD "The aftermath of hip fracture: discharge placement, functional status change, and mortality." Am J Epidemiol. 2009;170(10):1290. Epub 2009 Oct 4.

Block J. Gender dysphoria in young people is rising-and so is professional disagreement. BMJ. 2023 Feb 23;380:p382. doi: 10.1136/bmj.p382.

Block J. Norway's guidance on paediatric gender treatment is unsafe, says review. BMJ. 2023 Mar 23;380:697. doi: 10.1136/bmj.p697.

Bouraïma H, Lireux B, Mittre H, Benhaim A, Herrou M, Mahoudeau J, Guillon-Metz F, Kottler ML, Reznik Y. Major hyperestrogenism in a feminizing adrenocortical adenoma despite a moderate overexpression of the aromatase enzyme. Eur J Endocrinol. 2003 Apr;148(4):457-61. doi: 10.1530/eje.0.1480457. PMID: 12656667.

Bränström R, Pachankis JE. “Reduction in mental health treatment utilization among transgender individuals after gender-affirming surgeries: a total population study”. Am J Psychiatry 2020; 177:727–734.

Bränström R, Pachankis JE. “Toward Rigorous Methodologies for Strengthening Causal Inference in the Association Between Gender-Affirming Care and Transgender Individuals’ Mental Health: Response to Letters”. Am J Psychiatry 2020; 177:769–772; doi: 10.1176/appi.ajp.2020.20050599.

Brown BB & Larson J. Handbook of Adolescent Psychology. 3 Peer Relationships in Adolescence. John Wiley & Sons, Inc. 2009.

Carmichael P, Butler G, Masic U, Cole TJ, De Stavola BL, Davidson S, Skageberg EM, Khadr S, Viner RM. Short-term outcomes of pubertal suppression in a selected cohort of 12 to 15 year old young people with persistent gender dysphoria in the UK. PLoS One. 2021 Feb 2;16(2):e0243894. doi: 10.1371/journal.pone.0243894. PMID: 33529227; PMCID: PMC7853497.

Cass, Hillary. The Cass Review Interim Report. Feb, 2022. https://cass.independent-review.uk/publications/interim-report/

The Cass Review. Website. The Chair. Accessed on-line April 29, 2022. https://cass.independent-review.uk/about-the-review/the-chair/

Cavlan D, Bharwani N, Grossman A. Androgen- and estrogen-secreting adrenal cancers. Semin Oncol. 2010 Dec;37(6):638-48. doi: 10.1053/j.seminoncol.2010.10.016. PMID: 21167382.

CDC. “What is Venous Thromboembolism?” Accessed online 04/27/2022. https://www.cdc.gov/ncbddd/dvt/facts.html?msclkid=7406875bc6a411ecb67829f71b182f45

Chan Y, et al. “Evaluation of the infant with atypical genital appearance (difference of sex development)” UpToDate. Feb 18, 2021.

Christel J M de Blok, et al. “Breast cancer risk in transgender people receiving hormone treatment: nationwide cohort study in the Netherlands” BMJ 2019; 365 doi: https://doi.org/10.1136/bmj.l1652 (Published 14 May 2019)

Coleman E, et al. “Standards of Care for the Health of Transgender and Gender Diverse People, Version 8”. International Journal of Transgender Health. 06 Sep 2022. International Journal of Transgender Health. https://doi.org/10.1080/26895269.2022.2100644.

https://www.tandfonline.com/doi/pdf/10.1080/26895269.2022.2100644

Collet S, Gieles NC, Wiepjes CM, Heijboer AC, Reyns T, Fiers T, Lapauw B, den Heijer M, T'Sjoen G. Changes in Serum Testosterone and Adrenal Androgen Levels in Transgender Women With and Without Gonadectomy. J Clin Endocrinol Metab. 2023 Jan 17;108(2):331-338. doi: 10.1210/clinem/dgac576. PMID: 36201493; PMCID: PMC9844963.

"Correction to Bränström and Pachankis," Am J Psychiatry, 177:8 (Aug. 2020).

Correction, International Journal of Transgender Health, 23:sup1, S259- S261, DOI: 10.1080/26895269.2022.2125695

Council for Choices in Healthcare in Finland, Medical treatment methods for dysphoria associated with variations in gender identity in minors—recommendation, June 11, 2020, https://bit.ly/Cohere_Finland_ GDAinMinorsRx.

Curtis, D. "Study of Transgender Patients: Conclusions Are Not Supported by Findings". Am J Psychiatry 2020; 177:766; doi: 10.1176/appi.ajp.2020.19111131 ;

de Nie I, Mulder CL, Meißner A, Schut Y, Holleman EM, van der Sluis WB, Hannema SE, den Heijer M, Huirne J, van Pelt AMM, van Mello NM. Histological study on the influence of puberty suppression and hormonal treatment on developing germ cells in transgender women. Hum Reprod. 2022 Jan 28;37(2):297-308. doi: 10.1093/humrep/deab240.

de Vries AL, Steensma T, Doreleijers TA, Cohen-Kettenis PT. "Puberty suppression in adolescents with gender identity disorder: a prospective follow-up study". J Sex Med. 2011 Aug;8(8):2276-83.

de Vries AL, McGuire JK, Steensma TD, Wagenaar EC, Doreleijers TA, Cohen-Kettenis PT. "Young Adult Psychological Outcome After Puberty Suppression and Gender Reassignment". Pediatrics (2014) 134 (4): 696–704.

DEA. Diversion Control Division. Controlled Substance Schedules. Accessed May 1, 2022. https://www.deadiversion.usdoj.gov/schedules/

D'Angelo R, et al. "One Size Does Not Fit All: In Support of Psychotherapy for Gender Dysphoria". Archives of sexual behavior 2021; 50(1): 7–16.

Deegan DF, Engel N. Sexual Dimorphism in the Age of Genomics: How, When, Where. Front Cell Dev Biol. 2019 Sep 6;7:186. doi: 10.3389/fcell.2019.00186. PMID: 31552249; PMCID: PMC6743004.

Dhejne, et al., "Long-Term Follow-Up of Transsexual Persons Undergoing Sex Reassignment Surgery: Cohort Study in Sweden," PLoS One, vol. 6, issue 2 (Feb. 22, 2011)

Diamond M,Transsexuality Among Twins: Identity Concordance, Transition, Rearing, and Orientation, International Journal of Transgenderism. 2013.14:1, 24-38, DOI: 10.1080/15532739.2013.750222

Drummond KD, Bradley SJ, Peterson-Badali M, Zucker KJ. A follow-up study of girls with gender identity disorder. Dev Psychol. 2008 Jan;44(1):34-45. doi: 10.1037/0012-1649.44.1.34. PMID: 18194003.

Dunaif A, Segal KR, Futterweit W, Dobrjansky A. "Profound peripheral insulin resistance, independent of obesity, in polycystic ovary syndrome". Diabetes. 1989;38(9):1165.

Elhakeem A, et al. "Association Between Age at Puberty and Bone Accrual From 10 to 25 Years of Age". JAMA Network Open. 2019;2(8):e198918. doi:10.1001/jamanetworkopen.2019.8918

Emmanuel M & Bokor B. Tanner Stages. StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2022. https://www.ncbi.nlm.nih.gov/books/NBK470280/

Eugster EA. Treatment of Central Precocious Puberty. J Endocr Soc. 2019 Mar 28;3(5):965-972. doi: 10.1210/js.2019-00036.

FDA.gov, regarding celecoxib https://www.accessdata.fda.gov/drugsatfda_docs/label/2008/020998s026lbl.pdf accessed 10/01/22.

FDA.gov sumatriptan. "HIGHLIGHTS OF PRESCRIBING INFORMATION...IMITREX (sumatriptan)". https://www.accessdata.fda.gov/drugsatfda_docs/label/2021/020080s054lbl.pdf accessed 10/01/2022.

Florida Department of Health, Board of Medicine. Notice: 26873285, "64B8-9.019 Standards of Practice for the Treatment of Gender Dysphoria in Minors". Chapter: Standards of Practice for Medical Doctors. Effective 03/26/23. https://www.flrules.org/Gateway/View_notice.asp?id=26873285 accessed 04/04/2023.

Gagnon DR, Zhang T, Brand FN, Kannel WB. "Hematocrit and the risk of cardiovascular disease—The Framingham Study: a 34-year follow-up". Am Heart J. 1994;127(3):674-682.

Gaufen D and Norgren S. "Policy Change Regarding Hormonal Treatment of Minors with Gender Dysphoria at Tema Barn - Astrid Lindgren Children's Hospital". 2021. https://segm.org/sites/default/files/Karolinska%20Guideline%20K2021-4144%20April%202021%20%28English%2C%20unofficial%20translation%29.pdf

Greenpsan FS & Gardner DG. Basic & Clinical Endocrinology, 7th edition. Puberty. Lange Medical Books/McGraw-Hill. 2004.

Griffin, L., Clyde, K., Byng, R., & Bewley, S. (2021). "Sex, gender and gender identity: A re-evaluation of the evidence". BJPsych Bulletin, 45(5), 291-299. doi:10.1192/bjb.2020.73

Grynberg M, Fanchin R, Dubost G, Colau J, Brémont-Weil C, Frydman R, Ayoubi J. "Histology of genital tract and breast tissue after long-term testosterone administration in a female-to-male transsexual population". Reprod Biomed Online. 2010 Apr;20(4):553-8.

Guyatt GH, Oxman AD, Schünemann HJ, Tugwell P, Knottnerus A. GRADE guidelines: a new series of articles in the Journal of Clinical Epidemiology. J Clin Epidemiol. 2011 Apr;64(4):380-2. doi: 10.1016/j.jclinepi.2010.09.011. Epub 2010 Dec 24. PMID: 21185693. https://www.jclinepi.com/article/S0895-4356(10)00330-6/fulltext

Hall Ryan CW, Hall Richard CW, Chapman MJ. "Psychiatric Complications of Anabolic Steroid Abuse". Psychosomatics 46:4, July-August 2005.

Hardin AP, Hackell JM; COMMITTEE ON PRACTICE AND AMBULATORY MEDICINE. Age Limit of Pediatrics. Pediatrics. 2017 Sep;140(3):e20172151. doi: 10.1542/peds.2017-2151. Epub 2017 Aug 21. PMID: 28827380.

Hembree WC, et al., "Endocrine Treatment of Gender-Dysphoric/Gender-Incongruent Persons: An Endocrine Society Clinical Practice Guideline," The Journal of Clinical Endocrinology & Metabolism, Volume 102, Issue 11 (Nov. 1, 2017).

Irwig MS. "Cardiovascular health in transgender people." Rev Endocr Metab Disord. 2018;19(3):243–251.

Joham AE, Ranasinha S, Zoungas S, Moran L, Teede HJ. "Gestational diabetes and type 2 diabetes in reproductive-aged women with polycystic ovary syndrome". J Clin Endocrinol Metab. 2014 Mar;99(3):E447-52.

Kalin, N.H. "Reassessing Mental Health Treatment Utilization Reduction in Transgender Individuals After Gender-Affirming Surgeries: A Comment by the Editor on the Process by the Editor-in-Chief The American Journal of Psychiatry". Am J Psychiatry 2020; 177:7 64; doi: 10.1176/appi.ajp.2020.20060803

Kaltiala-Heino R, Sumia M, Työläjärvi M, Lindberg N. "Two years of gender identity service for minors: overrepresentation of natal girls with severe problems in adolescent development". Child and Adolescent Psychiatry and Mental Health (2015) 9:9.

Kralick AE, Zemel BS. Evolutionary Perspectives on the Developing Skeleton and Implications for Lifelong Health. Front Endocrinol (Lausanne). 2020 Mar 4;11:99. doi: 10.3389/fendo.2020.00099. PMID: 32194504; PMCID: PMC7064470.

Kuohong W and Hornstein MD. "Causes of female infertility". UpToDate. Jul 22, 2021.

Labcorp. Estradiol. https://www.labcorp.com/tests/004515/estradiol Accessed 02/04/23.

Laidlaw MK. "Gender Dysphoria and Children: An Endocrinologist's Evaluation of 'I am Jazz'". Public Discourse, 5 Apr 2018. https://www.thepublicdiscourse.com/2018/04/21220/

Laidlaw MK. "The Gender Identity Phantom", gdworkinggroup.org, Oct. 24, 2018. http://gdworkinggroup.org/2018/10/24/the-gender-identity-phantom/

Laidlaw MK, Cretella M, Donovan K. "The Right to Best Care for Children Does Not Include the Right to Medical Transition". The American Journal of Bioethics. 19(2), Feb 2019.

Laidlaw MK, Van Meter Q, Hruz P, Van Mol W, & Malone W, "Letter to the Editor: Endocrine Treatment of Gender-Dsyphoria/Gender-Incongruent Persons: An Endocrine Society Clinical Practice Guideline," J Clin Endocrinol Metab, 104(3) (March 2019).

Laidlaw MK, Van Mol A, Van Meter Q, Hansen JE. Letter to the Editor from M Laidlaw et al.: "Erythrocytosis in a Large Cohort of Trans Men Using Testosterone: A Long-Term Follow-Up Study on Prevalence, Determinants, and Exposure Years." The Journal of Clinical Endocrinology & Metabolism, Volume 106, Issue 12, December 2021, Pages e5275–e5276, https://doi.org/10.1210/clinem/dgab514

Landén, M. "The Effect of Gender-Affirming Treatment on Psychiatric Morbidity Is Still Undecided". Am J Psychiatry 2020; 177:767–768; doi: 10.1176/appi.ajp.2020.19111165.

Larsen PR, et al. Williams Textbook of Endocrinology, 10th edition. Philadelphia, W.B. Saunders Company, 2003.

Littman L. "Rapid-onset gender dysphoria in adolescents and young adults: a study of parental reports". PLoS One. 2018;13(8): e0202330

Lu J, Shin Y, Yen MS, Sun SS. Peak Bone Mass and Patterns of Change in Total Bone Mineral Density and Bone Mineral Contents From Childhood Into Young Adulthood. J Clin Densitom. 2016 Apr-Jun;19(2):180-91. doi: 10.1016/j.jocd.2014.08.001. Epub 2014 Oct 18. PMID: 25440183; PMCID: PMC4402109.

Ludvigsson J.F., Adolfsson J., Höistad M., Rydelius P.A., Kriström B., Landén M. (2023).
A systematic review of hormone treatment for children with gender dysphoria and recommendations for research. ACTA PAEDIATR. doi: 10.1111/apa.16791. Epub ahead of print. PMID: 37069492.

Lupron Depot-Ped. Highlights of Prescribing Information. AbbVie Inc. Accessed May 1, 2022. https://www.rxabbvie.com/pdf/lupronpediatric.pdf

MacKelvie KJ, Khan KM, McKay HA. Is there a critical period for bone response to weight-bearing exercise in children and adolescents? a systematic review. Br J Sports Med. 2002 Aug;36(4):250-7; discussion 257. doi: 10.1136/bjsm.36.4.250. PMID: 12145113; PMCID: PMC1724536.

Madsen MC, van Dijk D, Wiepjes CM, Conemans EB, Thijs A, den Heijer M. "Erythrocytosis in a Large Cohort of Trans Men Using Testosterone: A Long-Term Follow-Up Study on Prevalence, Determinants, and Exposure Years". J Clin Endocrinol Metab. 2021 May 13;106(6):1710-1717. doi: 10.1210/clinem/dgab089.

Malone, W. and Roman, S. "Calling Into Question Whether Gender-Affirming Surgery Relieves Psychological Distress". Am J Psychiatry 2020; 177:766–767; doi: 10.1176/appi.ajp.2020.19111149

Mayo Clinic. "Feminizing Surgery". https://www.mayoclinic.org/tests-procedures/feminizing-surgery/about/pac-20385102
Accessed 07/01/2022.

Mayo Clinic. "Masculinizing Surgery". https://www.mayoclinic.org/tests-procedures/masculinizing-surgery/about/pac-20385105 accessed 06/24/2022.

Mayo Clinic. "Top surgery for transgender men and nonbinary people". https://www.mayoclinic.org/tests-procedures/top-surgery-for-transgender-men/about/pac-20469462 accessed 06/24/2022.

McCartney CR, Corrigan MD, Drake MT, El-Hajj Fuleihan G, Korytkowski MT, Lash RW, Lieb DC, McCall AL, Muniyappa R, Piggott T, Santesso N, Schünemann HJ, Wiercioch W, McDonnell ME, Murad MH. Enhancing the Trustworthiness of the Endocrine Society's Clinical Practice Guidelines. J Clin Endocrinol Metab. 2022 Jul 14;107(8):2129-2138. doi: 10.1210/clinem/dgac290. PMID: 35690966.

Mehringer JE, et al. "Experience of Chest Dysphoria and Masculinizing Chest Surgery in Transmasculine Youth". Pediatrics (2021) 147 (3): e2020013300.

Méndez-Bustos P, Calati R, Rubio-Ramírez F, Olié E, Courtet P, Lopez-Castroman J. Effectiveness of Psychotherapy on Suicidal Risk: A Systematic Review of Observational Studies. Front Psychol. 2019 Feb 19;10:277. doi: 10.3389/fpsyg.2019.00277. PMID: 30837920; PMCID: PMC6389707

Miller M, Stone NJ, Ballantyne C, Bittner V, Criqui MH, Ginsberg HN, Goldberg AC, Howard WJ, Jacobson MS, Kris-Etherton PM, Lennie TA, Levi M, Mazzone T, Pennathur S; American Heart Association Clinical Lipidology, Thrombosis, and Prevention Committee of the Council on Nutrition, Physical Activity, and Metabolism; Council on Arteriosclerosis, Thrombosis and Vascular Biology; Council on Cardiovascular Nursing; Council on the Kidney in Cardiovascular Disease. Triglycerides and cardiovascular disease: a scientific statement from the American Heart Association. Circulation. 2011 May 24;123(20):2292-333. doi: 10.1161/CIR.0b013e3182160726. Epub 2011 Apr 18. PMID: 21502576.

Nahata L, Tishelman AC, Caltabellotta NM, Quinn GP. “Low fertility preservation utilization among transgender youth”. J Adolesc Health. 2017;61(1):40–44.

National Cholesterol Education Program (NCEP) Expert Panel on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults (Adult Treatment Panel III). Third Report of the National Cholesterol Education Program (NCEP) Expert Panel on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults (Adult Treatment Panel III) final report. Circulation. 2002 Dec 17;106(25):3143-421. PMID: 12485966.

Olson KR, Durwood L, Horton R, Gallagher NM, Devor A. Gender Identity 5 Years After Social Transition. Pediatrics. 2022 Aug 1;150(2):e2021056082. doi: 10.1542/peds.2021-056082.

Olson-Kennedy J, Okonta V, Belzer M, Clark LF. Chest Reconstruction and Chest Dysphoria in Transmasculine Minors and Young Adults: Comparisons of Nonsurgical and Postsurgical Cohorts. JAMA Pediatr. 2018 May 1;172(5):431-436.

NIH RePORTER. reporter.nih.gov. https://reporter.nih.gov/search/-EEMdHiQ8kyTvxzLPBxGyQ/project-details/10615754 accessed 06/20/23.

Pagadala M. "Comparison of the Concentration of Estrogen and Testosterone Ratio in Male Patients With Cirrhosis and Hypotension". ClinicalTrials.gov. https://clinicaltrials.gov/ct2/show/NCT05051293

Accessed 02/05/23.

Palko. Recommendation of the Council for Choices in Health Care in Finland (PALKO / COHERE Finland). 2020. https://genderreport.ca/wp-content/uploads/2021/04/Finland_Guidelines_Gender_Variance_In_Minors.pdf

Panchal AR, Bartos JA, Cabañas JG, Donnino MW, Drennan IR, Hirsch KG, Kudenchuk PJ, Kurz MC, Lavonas EJ, Morley PT, O'Neil BJ, Peberdy MA, Rittenberger JC, Rodriguez AJ, Sawyer KN, Berg KM; Adult Basic and Advanced Life Support Writing Group. Part 3: Adult Basic and Advanced Life Support: 2020 American Heart Association Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care. Circulation. 2020 Oct 20;142(16_suppl_2):S366-S468.

Pretorius M, et al. "Mortality and Morbidity in Mild Primary Hyperparathyroidism: Results From a 10-Year Prospective Randomized Controlled Trial of Parathyroidectomy Versus Observation". Ann Intern Med. 2022 Apr 19. doi: 10.7326/M21-4416. Online ahead of print.

Quest Diagnostics. Estrogen, Total, Serum.
https://testdirectory.questdiagnostics.com/test/test-detail/439/estrogen-total-serum?cc=MASTER
accessed on-line 02/05/23.

Quest Diagnostics. Hematocrit.
https://testdirectory.questdiagnostics.com/test/test-detail/509/hematocrit?cc=MASTER
accessed on-line 02/05/23.

Quest Diagnostics. Testosterone, Total, MS.
https://testdirectory.questdiagnostics.com/test/test-detail/15983/testosterone-total-ms?cc=MASTER
accessed on-line 01/12/23.

Reuters. “Sex-reassignment surgery yields long-term mental health benefits, study finds”. NBC News. Nov 8, 2019. https://www.nbcnews.com/feature/nbc-out/sex-reassignment-surgery-yields-long-term-mental-health-benefits-study-n1079911

Ristori J, Steensma TD. Gender dysphoria in childhood. Int Rev Psychiatry. 2016;28(1):13-20. doi: 10.3109/09540261.2015.1115754. Epub 2016 Jan 12. PMID: 26754056.

Santoro N. Update in hyper- and hypogonadotropic amenorrhea. J Clin Endocrinol Metab. 2011 Nov;96(11):3281-8. doi: 10.1210/jc.2011-1419. PMID: 22058375.

Sarnak MJ, Levey AS, Schoolwerth AC, Coresh J, Culleton B, Hamm LL, McCullough PA, Kasiske BL, Kelepouris E, Klag MJ, Parfrey P, Pfeffer M, Raij L, Spinosa DJ, Wilson PW, American Heart Association Councils on Kidney in Cardiovascular Disease, High Blood Pressure Research, Clinical Cardiology, and Epidemiology and Prevention. "Kidney disease as a risk factor for development of cardiovascular disease: a statement from the American Heart Association Councils on Kidney in Cardiovascular Disease, High Blood Pressure Research, Clinical Cardiology, and Epidemiology and Prevention." Circulation. 2003;108(17):2154.

Sax L. “How Common is Intersex? A Response to Anne Fausto-Sterling,” Journal of Sex Research 39:3 (August 2002), pp. 174-178.

SBU. Hormone treatment for gender dysphoria - children and young people. Sweden, Feb 22, 2022. https://www-sbu-se.translate.goog/sv/publikationer/SBU-utvarderar/hormonbehandling-vid-konsdysfori/?_x_tr_sl=sv&_x_tr_tl=en&_x_tr_hl=en&_x_tr_pto=sc Accessed on-line 05/17/2023

Singh, D. (2012). A follow-up study of boys with gender identity disorder. Unpublished doctoral dissertation, University of Toronto.

Skelton JA and Klish WJ. "Overview of the health consequences of obesity in children and adolescents". UpToDate. Jan 25, 2023.

Society for Evidence Based Gender Medicine (SEGM). Sweden’s Karolinska Ends All Use of Puberty Blockers and Cross-Sex Hormones for Minors Outside of Clinical Studies (May 5, 2021), https://bit.ly/SEGM_SwedenStops Hormones.

Society for Evidence Based Gender Medicine (SEGM). National Academy of Medicine in France Advises Caution in Pediatric Gender Transition. (Mar 3, 2022), https://segm.org/France-cautions-regarding-puberty-blockers-and-cross-sex-hormones-for-youth

Statement of Removal, International Journal of Transgender Health, 23:sup1, S259-S259. 2022. DOI: 10.1080/26895269.2022.2125695 https://www.tandfonline.com/doi/pdf/10.1080/26895269.2022.2125695

Steinberg L. "A social neuroscience perspective on adolescent risk-taking". Dev Rev. 2008;28(1):78-106.

Topjian AA, Raymond TT, Atkins D, Chan M, Duff JP, Joyner BL Jr, Lasa JJ, Lavonas EJ, Levy A, Mahgoub M, Meckler GD, Roberts KE, Sutton RM, Schexnayder SM; Pediatric Basic and Advanced Life Support Collaborators. Part 4: Pediatric Basic and Advanced Life Support: 2020 American Heart Association Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care. Circulation. 2020 Oct 20;142(16_suppl_2):S469-S523.

TLC UK. Bottom Surgery | I am Jazz. Youtube. Accessed May 1, 2022. https://www.youtube.com/watch?v=lG-U8oFpa8o

Turban JL, King D, Carswell JM, et al. "Pubertal Suppression for Transgender Youth and Risk of Suicidal Ideation". Pediatrics 2020, 145 (2) e20191725.

Van Mol, A., Laidlaw, M. K., Grossman, M., McHugh, P. "Gender-Affirmation Surgery Conclusion Lacks Evidence" Am J Psychiatry 177:8, August 2020 ajp.psychiatryonline.org 765.

Wang AMQ, Tsang V, Mankowski P, Demsey D, Kavanagh A, Genoway K. Outcomes Following Gender Affirming Phalloplasty: A Systematic Review and Meta-Analysis. Sex Med Rev. 2022 Aug 25:S2050-0521(22)00012-9. doi: 10.1016/j.sxmr.2022.03.002. Epub ahead of print. PMID: 36031521.

Wallien, M.S., & Cohen-Kettenis, P.T. (2008). Psychosexual outcome of gender-dysphoric children. Journal of the American Academy of Child and Adolescent Psychiatry, 47, 1413–1423.

Weitzer, D. "Transgender surgery linked with better long-term mental health, study shows". ABC News. Oct 8, 2019. https://abcnews.go.com/Health/transgender-surgery-linked-long-term-mental-health-study/story?id=66125676

Wilson D and Bruno B. Embryology, Mullerian Ducts (Paramesonephric Ducts). StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2022. https://www.ncbi.nlm.nih.gov/books/NBK557727/

Wold, A. (M.D., Ph.D.) Gender-Corrective Surgery Promoting Mental Health in Persons With Gender Dysphoria Not Supported by Data Presented in Article, Am J Psychiatry 2020; 177:768; doi: 10.1176/appi.ajp.2020.19111170

WPATH member search. https://www.wpath.org/member/search accessed 09/29/2022 and 10/01/2022.

Yelehe M. et al. "Adverse effects of gender-affirming hormonal therapy in transgender persons: Assessing reports in the French pharmacovigilance database." Fundamental and Clinical Pharmacology. June 2, 2022.

Zucker KJ. "Debate: Different strokes for different folks". Child and Adolescent Mental Health, Volume 25, Issue 1 (Feb 2020).